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HSE Procedure for Deep Drilling & Workover Operations

Proposal for a Drilling Company Operating in the Middle East

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ABSTRACT

The purpose of the hereby document is to implement a procedure that will be suitable to the deep drilling and workover operations carried out by the Deep Drilling Group from XYZ Company. Also is intended to obtain a uniformed document that will be a reference to all Contractors and Subcontractors working under The Deep Drilling Group.

The document will, obviously, be complemented with specific XYZ HSE procedures that are part of the actual management system implemented and which are a very useful source of information. Nevertheless, the information and recommendations compiled on the document do cover most of the needs for a safely operation, and they do comply with international industry best practices and regulations.

Besides the HSE Procedure, which is the main subject of the thesis, it is also possible to get an overview of industry HSE matters, information related to the oil industry in a Middle East Country, using Kuwait as reference, and a specific overview of the HSE status in the XYZ Company.

From practical side, the document directs the reader to an annexure where a full HSE procedure for drilling and workover operations is available for consultation and use.

Key Words: HSE Procedure, HSE Plan, Health and Safety and Drilling & Workover operations.

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LIST OF ABBREVIATIONS

ALARP – As Low As Reasonable Practical

ANSI – American National Standards Institute

API – American Petroleum Institute

COG – Centre of Gravity

D&T – Drilling and Technology

DDG – Deep Drilling Group

EDS – Emergency Disconnection Sequence

ERC – Emergency Response Centre

ESD – Emergency Shut-down System

GDP – Gross Domestic Product

HBV – Hepatitis B Virus

HIV – Human Immunodeficiency Virus

HOC – Hazardous Observation Card

HSEMS – Health, Safety, and Environment Management System

IADC – International Association of Drilling Contractors

IME – Institute of Makers of Explosives

IWCF – International Well Control Federation

JHA - Job Hazard Assessment

JSA – Job Safety Analysis

KEPA – Kuwait Environmental Public Authority

KOC – Kuwait Oil Company

KPI – Key Performance Indicator

KPM – Key Performance Measure

LEL – Low Explosive Limit

LOLER – Lifting Operations and Lifting Equipment Regulations

MOH – Ministry of Health

NEBOSH – National Examination Board in Occupational Safety

OEM – Original Equipment Manufacture

OPEC - Organization of the Petroleum Exporting Countries

OSHA – Occupational Safety and Health Administration

PTW – Permit to Work

RP – Recommend Practice

SDS – Safety Data Sheet

SIMOPS – Simultaneous Operations

SOC – Safety Observation Conversation

SOP – Safe Operation Procedure

UEL – Upper Explosive Limit

UN – United Nations

1. INTRODUCTION

Due to professional reasons the Company presented in this thesis is a fictional drilling company with the headquarters in Kuwait, hereinafter designated as Company XYZ or only XYZ

The hereby thesis idea arose during the period for the reviewing of the current HSE procedure in use by the drilling operations personnel of a State Owned Drilling Company in Middle East, and in which, as HSE professionals at the company we were invited to participate and to contribute to the improvement of it.

Looking into the practical side of it, the existing procedure had some gaps that were easily perceptible. There was information available that, although relevant to most of the operations carried out by the Group, was not relevant or feasible at drilling operations. Being drilling the core activity of the Deep Drilling Group, and considering that the current procedure was very generic for the type of operation, the review turned out to be almost a new procedure, that ended up including previous applicable information and the information gain from the inputs and ideas shared between the HSE team. From personal point of view the initial idea was that this thesis could be considered to the new reviewed procedure if approved.

Part of the information presented in the Annex - HSE Procedure for Deep Drilling & Workover Operations - Proposal for Drilling Company Operating in the Middle East, which is part of the thesis, ended up taking part of the last review of the procedure.

1.1. GENERAL

Comparing the available XYZ HSE plan for the drilling operations against the HSE guidelines for the State Owned Company, I observed that most of the information available for drilling operations such as procedures, safe practices, checklists, forms and other relevant documentation were just slightly adjusted to the drilling operations. In this case there were gaps in the drilling HSE guidelines but also excess of information coming from the State Owned Company HSE documents that are not applicable to the drilling operations. Looking in both of the documents, it seemed that “one size fits all”.

With the oil price downturn mid 2014 most of the industry workforce was laid-off and a considerable percentage of these employees were HSE professionals. At the end of 2016 the Country saw on this negative market downturn an opportunity to bring to their State Owned Company a new generation of workers who were already trained, with good skills and foremost with a vast knowhow, which would allow and support their company to improve their performance and quality standards on all the activities held by the them. HSE was one of those activities.

If we look back in time, Kuwait is still recovering from the Iraqi invasion in the 1990. Most of the oil industry facilities were or destroyed or badly damaged that needed to be re-built. After the liberation held by the allied forces Kuwait was all covered, until almost 1995, with black smoke resulting from the oil wells on fire. During that period most of the Kuwaitis left the country and only returning after few years. Only some workforce population stayed in the country to deal with the fires and recover the wells and equipment associated. Basically, and according to locals, Kuwait oil industry was on a sort of stand-by mode during the upcoming years while trying to reborn from the destruction. When oil industry resumed, the country kept most of the ideas and principles over the industry practices, on which includes HSE, very close to what was going on at the time of the invasion and slowly adjusting towards today's standards.

After the Iraqi invasion, the country found itself enable to run in to the golden years of the oil industry that were coming ahead. It took more than 20 (twenty) years for the country and companies to rebuild their facilities. The origin of the workforce accepting to work in Kuwait at that time was on their majority from close countries such as Pakistan, India, Bangladesh and other countries from Persian Gulf and Middle East areas.

It is theoretically known that some of these mentioned countries are, unfortunately, not so pro-active on teaching their population/workers regarding HSE at their workplace. Not only because of the lack of rules and regulations at those countries, but also as a cultural reason. This outside influence was prevented with the attempt of the State of Kuwait to reinforce, improve and implement new and better regulations on this matter. The HSE concerns started to be something that the country would have to deal in way

to get close to what was already being done on the oil industry in other countries around the world.

The idea of this document as part of the Master graduation thesis results, in some part, from my own initiative but also from some of the observations made and discussed during the regular monthly meetings held by the field HSE supervisors. The majority of the observations raised were related to the need of reviewing company procedures. It was being observed that most of them had their review date expired or the content was no more adequate for the purposes of the procedure.

1.2. STATE OF KUWAIT AND THE OIL INDUSTRY

The petroleum industry in Kuwait is the largest industry in the country, accounting nearly half of the country's gross domestic product (GDP). Kuwait has a proven crude oil reserves of 104 billion barrels (15 km³), estimated to be 9% of the world's reserves. Kuwait's oil reserves are the fourth largest in the world and the Burgan Field is the second largest oil field. Kuwait is the world's eleventh largest oil producer and seventh largest exporter. Kuwait's oil production accounts for 7% of world-wide oil production.

Since the government of Kuwait owns the oil industry, it controls a lot of the country's economy; in all, about 43 percent of the GDP. Kuwait's oil exports vary depending on internal needs – almost all of Kuwait's energy is derived from oil – and on international demand and prices and production quotas fixed by the Organization of the Petroleum Exporting Countries (OPEC), of which Kuwait is a member. OPEC's quotas, however, are difficult to enforce, and Kuwait and other countries have been accused of violating them. In 2015, oil production was 2.707 million bbl/day.

1.3. IMPORTANT DATES FOR THE OIL INDUSTRY IN KUWAIT

1.3.1. OIL DISCOVERY AND COMPANY PROGRESS

According to the State of Kuwait history archives, on February 22nd, 1938, oil was discovered in the Burgan field of Kuwait. The Kuwait desert had long stood witness to several strange black patches of a rough bituminous substance; but it was not until the

matter was investigated in 1935 did it become apparent that the wealth of Kuwait had remained underground for years and was yet to be discovered.

In 1921, Sheikh Ahmad Al-Jaber Al-Sabah became the Ruler of Kuwait. A brave and resourceful leader, a man of vision as well as a valiant warrior, Sheikh Ahmad was to steer his people through difficult times. As the 1920s was drawing to a close, the cultured pearl industry became a serious, and ultimately overwhelming competitor to Kuwait's main industry, pearl diving. In spite of this, and a subsequent worldwide decline in trade as the thirties began, he kept his faith in the future. This was largely because of several strange black patches of a rough bituminous substance that had long been observed in different parts of the desert. The Ruler and his people were well aware of the activities of the oil prospectors in neighbouring Bahrain, Saudi Arabia and Iraq - to say nothing of the Anglo-Persian Oil Company's successes in southern Iran. Their expectations raised by the Bahrain oil discoveries of 1932, the people of Kuwait were hopeful that these surface deposits were indications of underground reservoirs of a commodity, which could stimulate and revitalize their country's economy.

On December 23rd 1934, Sheikh Ahmad Al-Jaber Al-Sabah signed a document that was to increase his country's wealth and international importance: the first Kuwait Oil Concession Agreement was awarded to Kuwait Oil Company Limited. Kuwait Oil Company, Ltd. was formed by the Gulf Oil Corporation (presently Chevron Oil) and the Anglo-Persian Oil Company (presently British Petroleum).

While drilling continued in Bahrain, attention turned to Burgan and to the recommendations about this area in the technical report of Cox and Rhoades. Geological surveys were carried out and the company drilled in this area through 1937 and early 1938. It was here, on 22nd February 1938 that oil was discovered. Moreover, this oil was under such pressure and in such quantity that it blasted through the wellhead valve with such force that it could not be controlled. It was a gush that was "difficult to hold". Lack of sufficient drilling mud to block the hole meant that other means had to be immediately found to block the well. Donald Campbell, then Chief Accountant, finally located a 60 feet long wooden pole in the town bazaar and that served as a temporary

stopper. That was how, at 11 a.m., on a rainy Thursday morning Kuwait witnessed the birth of “Burgan No. 1”. Even today, this first well continues to produce.

On 30th June 1946, His Highness the late Sheikh Ahmad Al-Jaber Al-Sabah turned a silver wheel to start Kuwait's first crude oil export aboard the tanker "British Fusilier". This enabled the State of Kuwait to join the ranks of the world's major oil producers. At 7 o'clock in the morning of the 30th of June, 1946 a grand celebration was occasioned by exporting the first Kuwait's oil shipment. The celebration, held under the auspices of the late Sheikh Ahmad Al-Jaber A-Sabah (then the Amir of Kuwait), was attended by the country's senior officials, the Political Resident in the Gulf area, the Political Agent in Kuwait and a distinguished audience of guests. Mr. Southwell, Director of Kuwait Oil Company Ltd., London, started the event by receiving Sheikh Ahmad Al-Jaber A-Sabah and his companions and escorting them to the ceremony site, where the silver wheel had been placed to herald the occasion. Sheikh Ahmad turned the wheel to start the first Kuwait's crude oil shipment flowing smoothly through an offshore pipeline to the British tanker Fusilier. 10,567 tons of crude oil was loaded in 11 hours and 13 minutes, an average of 950 tons per hour. The 30th June 1996, marked the 50th anniversary of the export of Kuwait's first oil shipment.

A new era of historic importance began on 6th December 1975 with the Nationalisation of Kuwait's oil industry. In line with all the other Arab oil-producing states, Kuwait began negotiations in the early 1970s to restore control over its own natural oil resources. By mutual agreements with the Company's two original partners, the State's shareholding in Kuwait Oil Company was progressively increased until full control was achieved. On March 5th 1975, an agreement was signed by the State of Kuwait and the two oil companies (British Petroleum and Gulf) giving Kuwait complete control of its oil resources.

1.3.2. THE INVASION AND DESTRUCTION OF FACILITIES

On August 2nd 1990, previous Iraqi regime invaded Kuwait and inflicted heavy and devastating damages throughout the country's various economic, industrial, and infrastructure sectors. Kuwait's oil industry was the most devastated sector of all, and

the extent of the destruction inflicted at oil installations and facilities was unprecedented in the history of the modern oil industry.

The destruction unleashed on the oil installations and facilities was devastating and widespread. The first step taken by Kuwait Oil Company's management was to conduct an exhaustive survey of the damage sustained in the production areas. After determining the extent of damage, remedial measures began.

1.3.3. OIL WELL FIRES

An estimated 80% of oil wells had been ignited by the retreating Iraqi army, and ten gathering centres were totally destroyed. The amount of destruction in other areas varied. Gas booster stations and oil tank farms underwent varying degrees of damage while 13 tanks in the South Tank Farm and eight in the North Tank Farm were destroyed. The Sea Island facilities were also totally destroyed, and the North and South Piers required extensive repair and restoration work.

The Kuwait Wild Well Killers team was formed on September 9th 1991 to fight the oil well fires of Kuwait. The team was comprised of individuals with various specializations which included firefighters, drilling operators, petroleum engineers, support servicemen and safety engineers. The team from Kuwait astonished foreign firefighting teams and observers when they extinguished the first burning well in a record of 12 minutes. The team then went on to extinguish wells east of Um-Ghadir before joining other teams to extinguish the largest oil well fire at Burgan 160.

The team worked 14-hour days, and thanks to the zeal and enthusiasm of its members, the team was able to reduce the time needed to extinguish an oil well to one day and two hours compared to other teams from around the world that took three days and eight hours for each well.

To fully extinguish a single oil well required a process that involved many phases. First, the site was prepared and combed, mines and barb wires were removed from the areas surrounding the well, and its nearby oil lakes were emptied. This first process was conducted in order to allow the land to more quickly recover to its natural state.

The second phase consisted of extinguishing the well, cleaning its head after a very close and thorough inspection, and an examination and preparation of all necessary equipment and measurements. The extinguishing process was carried out either through oil pumping or by installing a piece inside the wellhead that already existed during the oil flow.

After the second phase, the well was sprayed with cool water. The third phase dealt mainly with repairing the wellhead and preparing it for operations. Three wells on average were extinguished daily, and the maximum number of wells controlled in one day was thirteen.

1.4. HEALTH AND SAFETY IN THE OIL AND GAS INDUSTRY

1.4.1. GENERAL OVERVIEW

For International Data Corporation – Energy (IDC), a global provider of market intelligence and advisory services, HSE remains the number 1 (one) priority for the oil and gas industry. Companies are used to dealing with strict HSE regulations across the entire span of their activity, from exploration and production, to pipeline management, down to refinery and marketing. These regulations are not only stringent but also constantly revised to take into consideration technological development and the more extreme conditions in which oil and gas companies operate.

IDC states in one of their latest reports that, near past major accidents — the Deepwater Horizon drilling rig in the Gulf of Mexico in 2010, the Californian San Bruno pipeline explosion in 2010, the Pemex pipeline explosion in 2012, refinery fires and shutdowns like the ones at BP Cherry Point, Chevron Richmond, and Amuay in Venezuela in 2012 — are strong reminders of the importance of being prepared for emergency situations and are constantly influencing the activity of national and international regulators. There are also additional regulations for unconventional oil and gas resources. The technique for extracting gas from shale — hydraulic fracturing or "fracking" — has raised environmental concerns about the water table. In the United States, for instance, companies engaged in fracking are required by federal law to report the composition of fluids that is used in the various stages of extraction. However, most of the regulation

of gas shale at this point lies with national, state, and local authorities that differ in their approaches.

1.4.2. HIGH-RISK ACTIVITIES ASSOCIATED TO INDUSTRY

During my experience as a safety professional for this industry, it is frequent that during a discussion about health and safety at the Oil and Gas extraction and in all of the activities associated to it, that people first reaction is to make references to fire hazards and the risks associated to it. People just realize that there exists more hazards than that one when you fully open them the book and provide them with more information about the industry, and also about all the activities that are part of the process. In fact, fire is one of the most recognized hazard on the industry, but he is not alone on this industry.

According to OSHA, the major companies acting on this industry have identified and considered that the following activities are high-risk activities that requires a high level of evaluation and assessment regarding health and safety.

- Vehicle Collisions;
- Struck-by, Caught-in and Caught-between;
- Explosions and Fires;
- Falls;
- Confined Spaces;
- Ergonomic Hazards;
- High Pressure Lines and Equipment;
- Electrical and Other Hazardous Energy;
- Machine Hazards;
- Planning and Prevention.

i. VEHICLE COLLISIONS

Workers and equipment are required to be transported to and from well sites. Wells are often located in remote areas, and require traveling long distances to get to the sites. Highway vehicle crashes are the leading cause of oil and gas extraction worker fatalities.

Roughly 4 of every 10 workers killed on the job in this industry are killed as a result of a highway vehicle incident (OSHA, 2018).

ii. STRUCK-BY/ CAUGHT-IN/ CAUGHT-BETWEEN

Three of every five on-site fatalities in the oil and gas extraction industry are the result of struck-by/caught -in/caught-between hazards (OSHA IMIS Database). Workers might be exposed to struck-by/caught-in/caught-between hazards from multiple sources, including moving vehicles or equipment, falling equipment, and high-pressure lines (OSHA, 2018).

iii. EXPLOSIONS AND FIRES

Workers in the oil and gas industries face the risk of fire and explosion due to ignition of flammable vapours or gases. Flammable gases, such as well gases, vapours, and hydrogen sulphide, can be released from wells, trucks, production equipment or surface equipment such as tanks and shale shakers. Ignition sources can include static, electrical energy sources, open flames, lightning, cigarettes, cutting and welding tools, hot surfaces, and frictional heat (OSHA, 2018).

iv. CONFINED SPACES

Workers are often required to enter confined spaces such as petroleum and other storage tanks, mud pits, reserve pits and other excavated areas, sand storage containers, and other confined spaces around a wellhead. Safety hazards associated with confined space include ignition of flammable vapours or gases. Health hazards include asphyxiation and exposure to hazardous chemicals. Confined spaces that contain or have the potential to contain a serious atmospheric hazard must be classified as permit-required confined spaces, tested prior to entry, and continuously monitored (OSHA, 2018).

v. ERGONOMIC HAZARDS

Oil and gas workers might be exposed to ergonomics-related injury risks, such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures, and performing the same or similar tasks repetitively. Risk

factors and the resulting injuries can be minimized or, in many cases, eliminated through interventions such as pre-task planning, use of the right tools, proper placement of materials, education of workers about the risk, and early recognition and reporting of injury signs and symptoms (OSHA, 2018).

vi. HIGH PRESSURE LINES AND EQUIPMENT

Workers might be exposed to hazards from compressed gases or from high-pressure lines. Internal erosion of lines might result in leaks or line bursts, exposing workers to high-pressure hazards from compressed gases or from high-pressure lines. If connections securing high-pressure lines fail, struck-by hazards might be created (OSHA, 2018).

vii. ELECTRICAL AND OTHER HAZARDOUS ENERGY

Workers might be exposed to uncontrolled electrical, mechanical, hydraulic, or other sources of hazardous energy if equipment is not designed, installed, and maintained properly. Further, administrative controls such as operating procedures must be developed and implemented to ensure safe operations (OSHA, 2018).

viii. MACHINE HAZARDS

Oil and gas extraction workers may be exposed to a wide variety of rotating wellhead equipment, including top drives and Kelly drives, drawworks, pumps, compressors, catheads, hoist blocks, belt wheels, and conveyors, and might be injured if they are struck by or caught between unguarded machines (OSHA, 2018).

1.5. COMPANY HSE OVERVIEW

It is estimated that the company provides 21509 (twenty-one thousand five hundred and nine direct jobs and approximately 50000 (fifty thousand) indirect ones.

If we considered an average of 8 (eight) working hours per day per each employee, we have every day approximately 572.072 (five hundred and seventy-two thousand and seventy-two) working man-hours per day and approximately 16.018.016 (sixteen million eighteen hundred and sixteen) man-hours worked per month. At this point I need to

refer that some operations are 24 (twenty-four) hours a day and 7 (seven) days a week, therefore I have considered a 28 days period for a month as average. Unfortunately it was not possible to get more detailed figures from local authorities and company, unless some information available at State Owned Company website.

Looking at the numbers and charts below, the first thing that will stand out is the number of fatalities. It is definitely a number that should worry all if the achievement is zero harm. Although the majority resulted from car accidents or other vehicles accidents and only a few are consequence of an incident at the rigs, the numbers speak for themselves and improvements need to be considered in a short period.

It was not provided a full access to statistics and to the intranet system in use and therefore a limited access to the figures that I would like to present here. The HSE Overview figures below are from the Company and not only for Deep Drilling Group, and will fall under Near misses, Hazardous conditions, Incidents and fatalities. Lost Time Injuries (LTI) were not available.

A) INCIDENTS OVERVIEW

According to the data made available, in the last 5 (five years), between 2013 and 2017, the company faced a total of 3094 (three thousand and ninety-four) registered incidents and a total of 34 (thirty-four) lives lost. As mentioned before, these losses were mainly related with motor vehicle accidents. Just as a note, the Company has been holding trainings on defensive driving and in-house awareness trainings on safety while driving, trying to get the workforce more conscious on safe driving, inside and outside the fields and when travelling to and from their workplace.

Incidents					
Company XYZ					
	2013	2014	2015	2016	2017
Personal Injuries	177	183	230	179	181
Fire/Explosions	47	40	32	40	48
Major Vehicle Accidents (MVA)	156	140	120	155	130
Asset Damages	148	122	131	135	138
Environmental Incidents	136	98	109	108	111
Fatalities	3	4	13	9	5
Total	664	583	622	617	608

Source: classified

Table 1 - Five years Incidents figures (2013-2017)

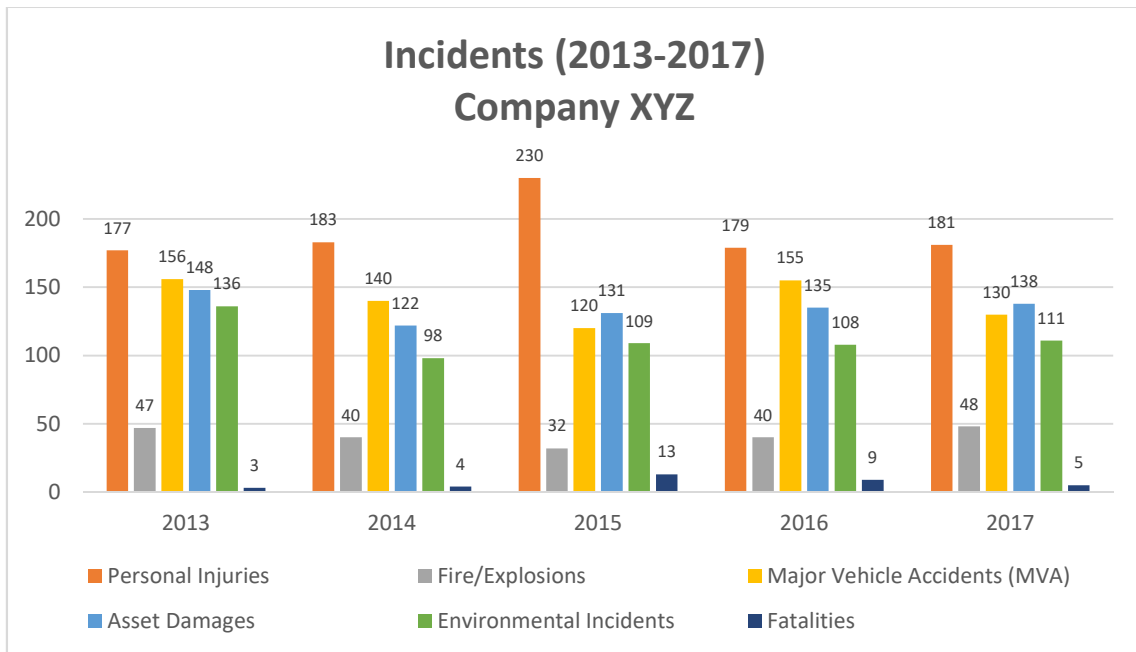


Chart 1 - Five years Incidents (2013-2017)

Even though the year of 2018 is not finished at the time of this document, it was of interest to observe the actual year figures until end of October and what the trend is for the year. Looking at the below chart (chart 2) we can observe that the numbers for 2018 are already high when compared to previous year. When looking at Table 1 the average on 2017 was nearly 1.7 incidents per day and until October 31st of 2018 we have already an average of nearly 1.9 incidents per day. Considering these two numbers the tendency is to say that it is expected that 2018 figures for incidents may be higher than the ones from the previous year.

Incidents (01.01.18 to 31.10.18)	
Company XYZ	
Personal Injuries	148
Fire/Explosions	34
Major Vehicle Accidents (MVA)	127
Asset Damages	98
Environmental Incidents	159
Fatalities	5
Total	571

Source: classified

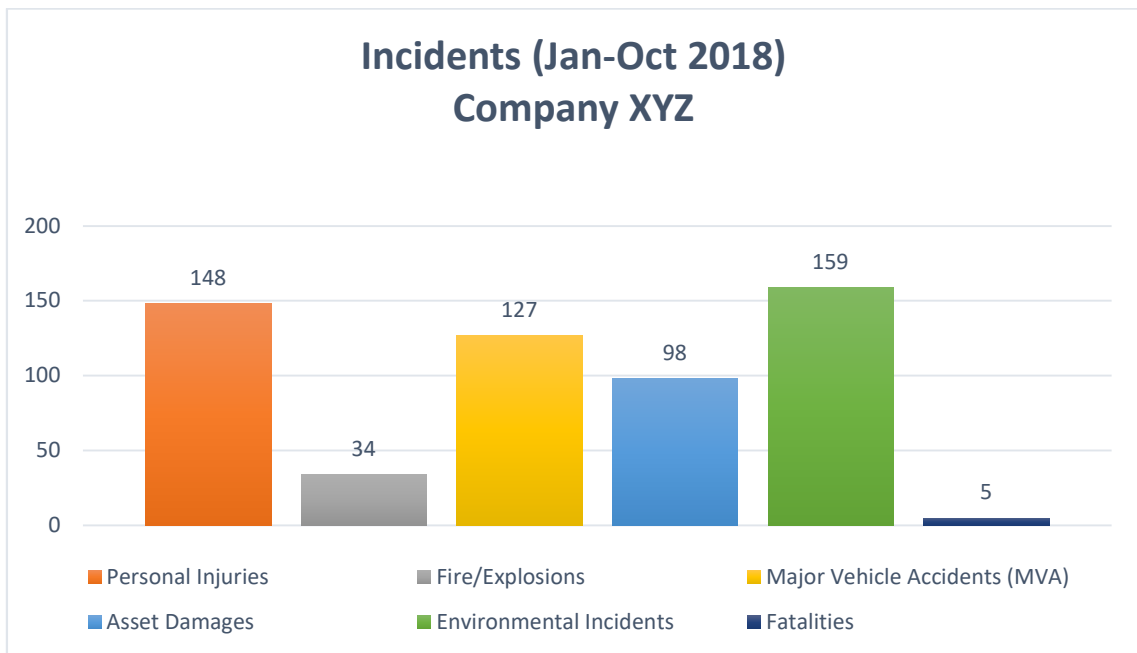
Table 2 - 2018 Incidents until October 31st

Chart 2 - Incidents from Jan. to Oct. 2018

B) NEAR MISS AND HAZARDOUS CONDITIONS OVERVIEW

At the XYZ company HSEMS a “Near Miss” is an unplanned or uncontrolled event or chain of events that has not resulted in Harm (i.e. not resulted in injury, or physical damage or environmental damage but had the potential to do so in other circumstances). As for the “Hazardous Condition” it is defined as any existing or potential condition in the workplace which, by itself or by interacting with other variables, can result in injury, property damage, Environment Damage and / or other losses.

Near Miss and Hazardous Conditions have the same importance on study them as studying for an incident. For this, it is important to stress companies, workers and safety professionals on reporting this type of situations. Promote a safety culture based on prevention actions instead of reactive actions.

Again, the below figures represent the last five years (table 3) and the current year of 2018 (table 4) of reported situations. At the time of the document it was only possible to collect information for the period between January and October of 2018.

Near Misses & Hazardous Conditions					
Company XYZ					
	2013	2014	2015	2016	2017
Total Incidents	664	583	622	617	608
Near Misses	4208	4287	4479	5296	6716
Hazardous Conditions	7297	8538	9099	11270	13954

Source: classified

Table 3 - Five years figures for Near Misses and Hazardous Conditions (2013-2017)

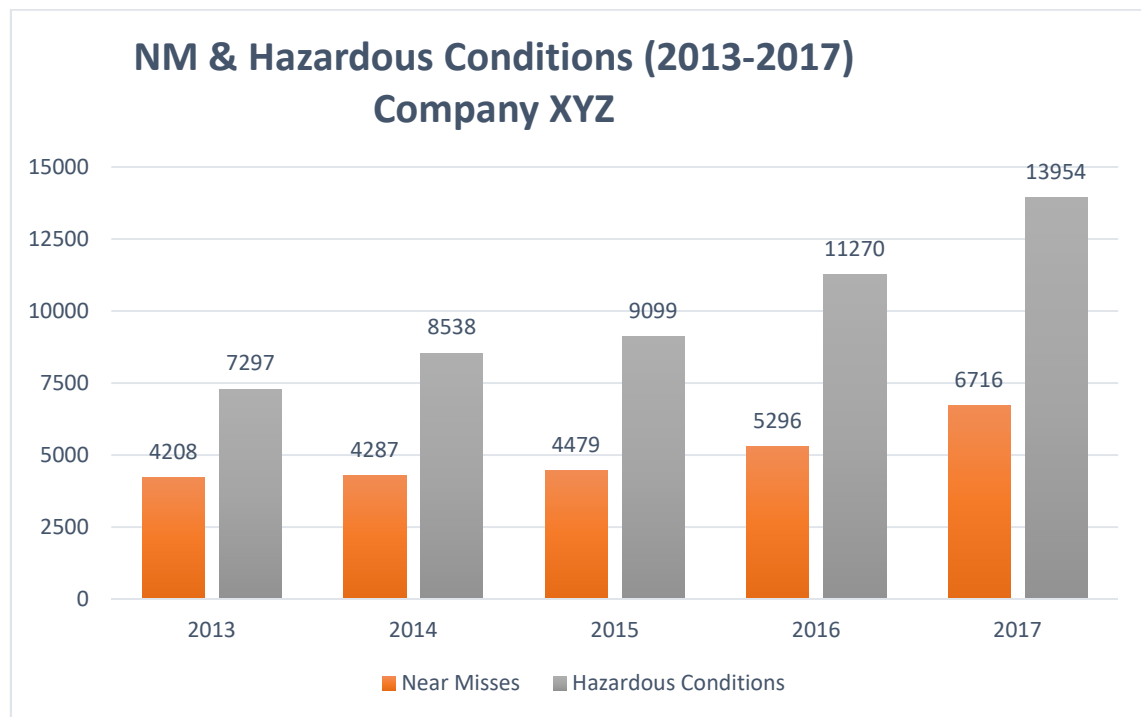


Chart 3 – Five years statistics for near misses and hazardous conditions (2013-2017)

Incidents are slowly reducing along the years with 2014 leading as the year with the lowest number. On the other hand, an increase on reporting for Near Misses and Hazardous conditions has been observed. Not reporting these near misses and

hazardous conditions could have resulted in different figures on the number of incidents occurred.

Near Misses & Hazardous Conditions (01.01.18 to 31.10.18)	
Company XYZ	
Total Incidents	571
Near Misses	4742
Hazardous Conditions	9431

Source: classified

Table 4 - 2018 Near Misses & Hazardous Conditions reported until October 31st

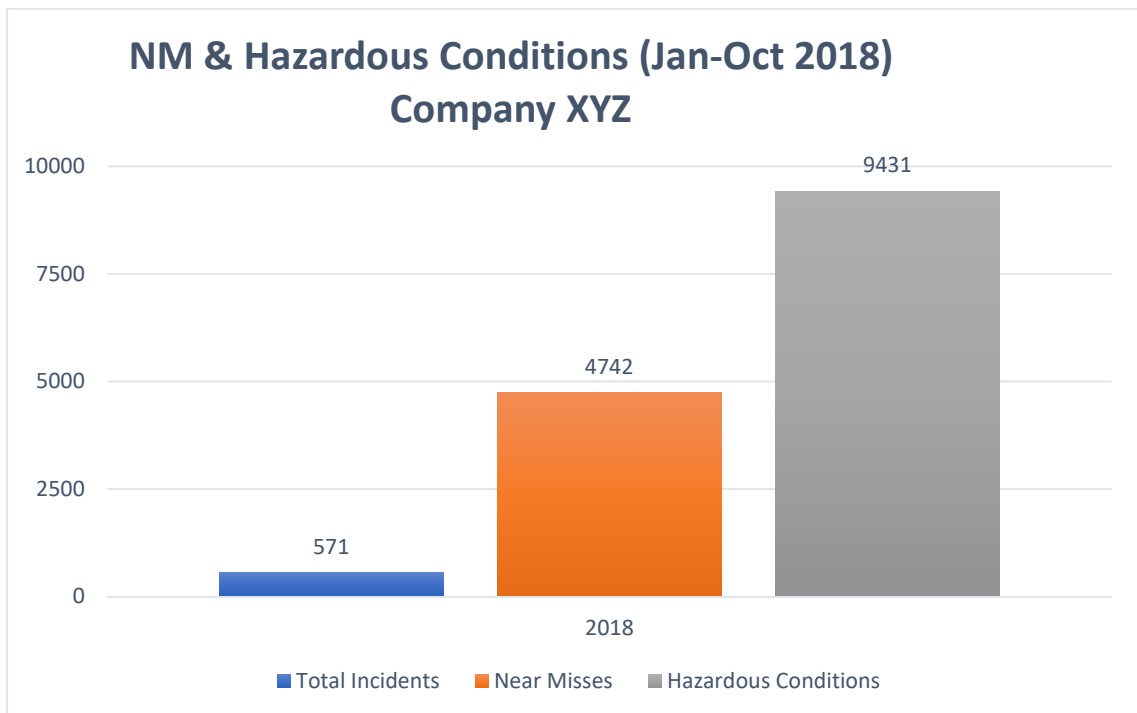


Chart 4 - Near Misses and Hazardous Conditions from Jan. to Oct. 2018

2. HEALTH, SAFETY AND ENVIRONMENTAL PLAN

2.1. INTRODUCTION TO HSE PLAN

Making an HSE plan is more than creating a set of rules for manufacturing health, safety, and environmental activities (Manzer, 2013).

An HSE Plan is a written document that describes the process for identifying the physical and health hazards that could harm workers, procedures to prevent accidents, and steps to take when accidents occur. Written HSE plans can be comprehensive, such as an injury and illness prevention program, or they can be specific to a particular activity, hazard, or piece of equipment. The written safety plan is the blueprint for keeping workers safe. Many organizations compile their activity-specific HSE plans into a single safety manual (OSHA, 2018).

2.2. ELEMENTS

It is common among all Boards and Institutes who rule HSE that each written plan shall include the following basic elements:

- Description;
- Health, Safety and Environment structure and system;
- Induction and safety training;
- Safe work practices and procedures;
- Risk assessment;
- Workplace health and safety inspections;
- Health and safety consultation;
- Emergency Procedures;
- Incident recording and investigation;
- Health and safety performance monitoring.

2.2.1.DESCRPTION

A brief description of the scope of work associated with the activity should be documented. The description should be sufficiently detailed to provide persons

unfamiliar with the activity an overview of the type of work being carried out and under what conditions.

The scope of work should include as a minimum requirement the following details:

- Summary of major activities and types of work to be performed.
- List of tasks or specialist procedures that may require detailed health and safety work procedures and training.
- List areas of activity requiring special consideration from a health and safety perspective:
 - Presence of public;
 - Traffic management;
 - Work restrictions (work times, confined spaces);
 - Exposure to hazards (noise, dust, elevated heights).

2.2.2. HEALTH, SAFETY AND ENVIRONMENT STRUCTURE AND SYSTEM

The HSE Plan should be established around existing management systems and associated procedures and controls. References should be made to existing procedures and documentation in the HSE Plan. This will also assist in minimising the size of the document.

The Company should outline the management structure, responsibilities, standards and control systems applicable to the activity to ensure all HSE requirements are adequately addressed. The following information should be included:

- Company HSE policy to be displayed at worksites;
- An outline of the company HSE organisation and structure where includes names and/or positions of those with specific responsibilities towards HSE;
- Summary of HSE roles and responsibilities of the personnel involved on the activity;
- Position and/or name of senior person who will liaise with The Principal on health and safety matters.

2.2.3. INDUCTION AND SAFETY TRAINING

HSE legislation requires all employers to ensure that their employees have the skills and training required to carry out their work in a safe manner. It is required that employers document their safety-training program ensuring that they have appropriately skilled employees, suitable training programs and adequate supervision for the contract works (Health and Safety Executive, 2018).

The following information should be provided:

- An outline of company induction procedures for employees and subcontractors;
- Details of induction course content;
- Register of personnel who have satisfactorily completed the company induction;
- Provide a register of names and/or positions of company employees with authorisations, permits, competency certificates, licences etc. who may be required to supervise or undertake specialist work activity.

2.2.4. SAFE WORK PRACTICES AND PROCEDURES

Relevant safe work practices and procedures should where appropriate be developed for the contract. Where possible, existing health and safety company procedures should be used. However, contract specific safe work procedures may need to be developed on the basis of particular contract hazards. These may be identified when undertaking the Risk Assessment.

The following information should be provided:

- Provide a list and copies of company safe work procedures or instructions relevant to the activity;
- Detail site operations that will be subject to permit to work systems;
- Provide details of employees and/or subcontractors issued with copies of safe work procedures and instructions;
- Safe work procedures and instructions should be recorded on Safe Work Procedure/Instruction Register.

2.2.5. RISK ASSESSMENT

The Risk Assessment is an integral part of the HSE plan and needs consider, according to the Health and Safety Executive in UK, 5 (five) important steps:

- Identify the hazards;
- Decide who might be harmed and how;
- Evaluate the risks and decide on precautions;
- Record significant findings;
- Review assessment and update if necessary.

2.2.6. WORKPLACE HSE INSPECTIONS

HSE inspections are important and will help the company, like the risk assessments, in the identification of hazards and in the development of control measures. The HSE plan should outline the methods and procedures by which workplace activities will be inspected, time frame or periodicity of such inspections.

The company HSE plan should provide information on:

- Details of how workplace HSE inspections will be carried out, checklists that will be used, frequency of inspections, inspecting team and findings register for actions for improvements;
- Details of hazards reporting and reporting forms;
- Information of specific activities or areas targeted for inspection such as plant, hazards materials stores, electrical safety, fire safety, etc.

2.2.7. HSE CONSULTATION

Listening to the employees provides an important mechanism whereby health and safety issues can be dealt with in a manner that promotes ownership and prompt resolution of the situations.

A list of current employer and employee safety representatives should be made available.

2.2.8. EMERGENCY PROCEDURES

There is the potential for a range of emergency situations to occur. These situations need to be identified and a specific emergency plan developed and made known.

Information to be documented:

- Overall emergency plan and structure for the company;
- Register of the location of emergency equipment such as first aid equipment, first aid facilities, fire extinguishers, emergency eye wash stations, and respiratory protection equipment;
- Register of current qualified First Aiders;
- Arrangements/co-ordination with external authorities and emergency services in the event of an emergency situation.

2.2.9. INCIDENT RECORDING AND INVESTIGATION

All incidents associated with the contract involving personal injury, medical treatment or property damage should be recorded and investigated.

Company shall document:

- Details of incident reporting and investigation system and procedures;
- Details of how the different levels incidents shall be notified to Management and authorities;
- Details of how incident findings are shared with among the employees;
- Details of how incident statistics are to be compiled.

2.2.10. HEALTH AND SAFETY PERFORMANCE MONITORING

Measurement is a key step in any management process and forms the basis of continual improvement. If measurement is not carried out correctly, the effectiveness of the health and safety management system is undermined and there is no reliable information to inform managers how well the health and safety risks are controlled.

Although there is much information available on performance measurement generally, there is little which looks at health and safety in particular which organisations can apply to their own circumstances.

Company should decide and implement their own Key Performance Indicators (KPI). KPI is a measurable value that demonstrates how effectively a company is achieving their HSE objectives. Organizations use key performance indicators at multiple levels to evaluate their success at reaching targets. High-level KPIs may focus on the overall performance of the company, while low-level KPIs may focus on processes or employees.

The KPIs defined by the company should be specific, measurable, achievable, relevant and with a time-frame to achieve their goals. It is common for the companies to use the acronym SMART when defining their KPIs.

3. HSE PROCEDURE FOR DEEP DRILLING & WORKOVER OPERATIONS

An HSE procedure for Deep Drilling and Workover operations is the main subject of this thesis on which I consider to be more than a mere academic dissertation, but an important tool for working on drilling operations on a daily basis.

With this tool it is possible to ensure that all HSE standards, regulations and procedures are followed at almost every moment of the operation being performed. I should remind that the process to drill a well starts way before the drilling platform reaches the location. At first there is a bureaucratic process and seismic studies that are not contemplated here since they would be irrelevant to what is intended for this thesis.

The available attachment addresses the entire operation since the site preparation, where the well will be drilled, until the moment that a full wellhead is installed and the well is handed-over to the Development Group, who from thereafter is the owner of the well. During all this period, besides the drilling part, there are a lot of activities such critical lifts, rig move and all the heavy equipment associated, construction, rigging up, casing, cementing, pressure tests with pressures higher than 15000psi, work at height, manual handling, chemical handling, H₂S exposure, handling and use of explosives, etc. All these are activities demand a high safety culture of all involved, demanding HSE standards, proper procedures implemented and training and competency. If we combine all this, we will achieve our main goal, to complete a well with Zero incidents and Zero harm.

Also attached it is possible to access, for reference, a total of 16 forms and checklists that are considered relevant to carry out a safe operation.

4. CLOSING NOTES

From all the information that is stated in this document the one that will cause more discussion and will have more impact on whom will access it is the number of fatalities registered over a five-year period. Maybe this is even the reason that the company at a certain point decided not to support and be part of this academic thesis.

In fact, considering the demanding standards of the industry nowadays, these numbers are considered very high and frightful for an industry that claims to be one of the safest. On the other hand, and as it has been mentioned before, some Middle East countries don't look onto health and safety as an investment, but as an expense. The fear of time consumption with safety at this point compromises the time need for exploration, development and production of a well when considering that oil market is still on a downturn. However, according to latest Organization of the Petroleum Exporting Countries (OPEC) expectations, 2019 will see a small return in the market but still not expected to reach a \$100USD a barrel.

But not everything are bad news or comments that should be stated here. There are also positive points that were found while writing and collecting information for the thesis. For example, the company HSE Directorate has started planning a new safety training program to be provided to the contractor staff when joining the rigs. Also, a review to the contractual HSE requirements is ongoing in way to ensure that all new contracts that will be signed, from 2019 and onwards, will demand more from the contractors regarding HSE compliance from their end. All these actions are ongoing and will for certain improve the HSE standards and compliance, at first inside company and later on with all the contractors and their subcontractors.

Although the intention of this thesis was not fully accomplished due to the restrictions that I had to face off and also due to the fact that only a few parts of it were used for the review, I still have plans for it in the near future. From the different ideas I have at the moment, the one that I am already working on it is a small project related with communication of safe work to the employees. The majority of the junior workers at the oilfield are from poor countries and with low level of education, therefore the language

barrier is truly big among the workers as most of them have basic knowledge of English language or Arabic. Knowing that an image is worth a thousand words, the idea is to create prompt cards to be distributed by the workers when they first arrive on the working sites, also to have them available at site for everyone who needs. Those prompt cards will approach the safety aspects by graphic images of what are the proper tools and equipment to be used for the task they are assigned to. It is obvious that these cards need to have a small basic description that will be in English and Arabic, but most it will only be images.

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- KOC.SA.004 Permit to Work Procedure;
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6. ANNEX

School of Technology and Management

Master degree in Health and Safety

HSE Procedure for Deep Drilling & Workover Operations

Proposal for a Drilling Company Operating in Middle East

Kevin Rodrigues

Beja

2018

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LIST OF ABBREVIATIONS

ALARP – As Low As Reasonable Practical

ANSI – American National Standards Institute

API – American Petroleum Institute

COG – Centre of Gravity

D&T – Drilling and Technology

DDG – Deep Drilling Group

EDS – Emergency Disconnection Sequence

ERC – Emergency Response Centre

ESD – Emergency Shut-down System

GDP – Gross Domestic Product

HBV – Hepatitis B Virus

HIV – Human Immunodeficiency Virus

HOC – Hazardous Observation Card

HSEMS – Health, Safety, and Environment Management System

IADC – International Association of Drilling Contractors

IME – Institute of Makers of Explosives

IWCF – International Well Control Federation

JHA - Job Hazard Assessment

JSA – Job Safety Analysis

KEPA – Kuwait Environmental Public Authority

KOC – Kuwait Oil Company

KPI – Key Performance Indicator

KPM – Key Performance Measure

LEL – Low Explosive Limit

LOLER – Lifting Operations and Lifting Equipment Regulations

MOH – Ministry of Health

NEBOSH – National Examination Board in Occupational Safety

OEM – Original Equipment Manufacture

OPEC - Organization of the Petroleum Exporting Countries

OSHA – Occupational Safety and Health Administration

PTW – Permit to Work

RP – Recommend Practice

SDS – Safety Data Sheet

SIMOPS – Simultaneous Operations

SOC – Safety Observation Conversation

SOP – Safe Operation Procedure

UEL – Upper Explosive Limit

UN – United Nations

1. GENERAL

1.1. SCOPE

The purpose of this document is to recommend practices to establish a safe working environment for personnel working on drilling and workover operations.

This document applies, in general, to Deep Drilling Group, Development and Technical Support Groups, Contractors, Subcontractors and Service Companies Working with Company XYZ on on-land Drilling and Workover Operations.

1.2. DEFINITIONS:

Authorized person: A person, who is technically competent, experienced and assigned by an employer to perform or supervise the performance of a specific type of duty at work site.

Banksman/Signaller/Rigger: A skilled and formally trained person who directs the operation of lifting, shifting equipment which includes the selection, preparatory inspection and attachment of the gear to be used for lifting the load up to the time when load is detached.

Blood borne Pathogens: Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Blow Out Preventer (BOP): A device attached to the well head or Christmas tree that allows the well to be closed in with or without a string of pipe or wire-line in the borehole.

Blow out: An uncontrolled flow of the well fluids and/or formation fluids from the wellbore or into lower pressured subsurface zones.

Buddy System: A system of organizing employees into workgroups in such a manner that each employee of the work group is designated to be observed by at least one other

employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

Catwalk: A long rectangular platform about 3ft high usually made of steel and located perpendicular to the V-Door at the bottom of the slide. This platform is used as the staging area for rig and drill string tools, components that are about to be picked up and run, or components that have been run and are being laid down.

Competence: The ability to perform a particular job in compliance with performance standards, experience or have completed the correct/required training.

Competent person: A person having expertise in a specific area of work to perform his duties safely, effectively and efficiently.

Critical equipment: Equipment and other systems determined to be essential in preventing the occurrence of or mitigating the consequence of an uncontrolled event. Such equipment may include vessels, machinery, piping, blowout preventers, wellheads and related valves, flares, alarms, interlocks, fire protection equipment, breathing air system and other monitoring, control and response systems.

Critical Lifts: Lifts with cranes weighing more than 50 tons, exceeding 75% of rated crane capacity, tandem lift involving more than one crane, involving crane movement within the minimum distances from High voltage power lines (as per API RP 54), Blind Lift, personnel lifts in personnel baskets, lifting of - BOP equipment, mud pump, mast, sub-structure and any part of a crane whose boom or boom attachment is working within 10 meters (33 feet) of any hydrocarbon and/or pressurized piping areas. All critical lifts need lifting plan implemented.

Degasser: A device that removes air or gases (methane, H₂S, CO₂ and others) from drilling liquids. There are two generic types that work by both expanding the size of the gas bubbles entrained in the mud (by pulling a vacuum on the mud) and by increasing the surface area available to the mud so that bubbles escape (through the use of various cascading baffle plates). If the gas content in the mud is high, a mud gas separator or

"poor boy degasser" is used, because it has a higher capacity than standard degassers and routes the evolved gases away from the rig to a flaring area complete with an ignition source.

Derrick-man: Person usually positioned up in the derrick to monitor the hoisting/lowering the pipes into the hole, retrieves the pipe while running in the hole from finger board and secure into the elevators, and takes pipes from elevators and securing in finger board while pulling out of the hole.

Desander: A hydro-cyclone device that removes large drill solids from the whole mud system. The desander should be located downstream of the shale shakers and degassers but before the desilters or mud cleaners. A volume of mud is pumped into the wide upper section of the hydro-cyclone at an angle roughly tangent to its circumference. As the mud flows around and gradually down the inside of the cone shape, solids are separated from the liquid by centrifugal forces. The solids continue around and down until they exit the bottom of the hydro-cyclone (along with small amounts of liquid) and are discarded. The cleaner and lighter density liquid mud travels up through a vortex in the centre of the hydro-cyclone, exits through piping at the top of the hydro-cyclone and is then routed to the mud tanks and the next mud-cleaning device, usually a desilter. Various size desander and desilter cones are functionally identical, with the size of the cone determining the size of particles the device removes from the mud system.

Desilter: A hydro-cyclone much like a desander except that its design incorporates a greater number of smaller cones. As with the desander, its purpose is to remove unwanted solids from the mud system. The smaller cones allow the desilter to efficiently remove smaller diameter drill solids than a desander does. For that reason, the desilter is located downstream from the desander in the surface mud system.

Drill Pipe: Heavy seamless tubing used to rotate the drill bit and circulate drilling fluid. Usually in 30 feet lengths, the jointing of drill pipes is achieved with special threaded connections called tool joints.

Drill Stem Test: A test taken by means of special testing equipment run into the wellbore on the drill string to determine the producing characteristics of a formation.

Drill Stem: The entire drilling assembly from swivel to the bit composed of Kelly, drill string (work string) and other down hole tools. This assembly is used to rotate the bit and carry the drilling fluid to the bit.

Driller: Person responsible for the operation of the drilling and hoisting equipment and first line Supervisor who controls the activities of his drilling crew.

Driver: A trained and experienced person who is capable by practice and enabled by granting a permission of a legal system to drive equipment for the purpose of transporting personnel and/or materials from one place to other. The Driver shall at all-time possess valid license to drive the prime mover. At any given time, such driver shall not be allowed to perform as "Operator" of lifting, shifting and material handling equipment unless he fulfils the requirement of Operator as defined above.

ELCB: Earth Leakage Circuit Breaker is a safety device used in electrical installations/equipment with high earth impedance to prevent electrical leakage which leads to electrical shock.

Ergonomics: Scientific discipline concerned with the understanding of interactions of humans and other elements of a system, and to design in order to optimize human well-being and overall system performance.

Flammable Liquid: Any liquid having a flashpoint below 100°F (37.8°C).

Fly Camp: A camp established for a limited period of time for seismic line operations.

Ground Anchor (dead-man): A static holding device installed in the ground separate from the rig structure and to which guy lines may be attached.

Guy-line: Wire rope that is attached to elevated structures such as derricks and ground anchors for stability.

Hazard: A state or condition or physical or chemical characteristic having the potential for causing damage to property and/or injury to people.

Hazardous Condition: A hazard is any existing or potential condition in the workplace which, by itself or by interacting with other variables, can result in injury, property damage, environment damage, and other losses.

High density Areas: A high-density area shall be determined during the planning stages of a drilling operation, on a well-by-well basis, by calculating the number of occupied building units within 1000 feet (300 m) radius from the wellhead. If eighteen (18) or more building units are within any semi-circle of the 1000 feet (300 m) radius, it shall be deemed a high-density area. In terms of the population if it is more than 46 people/Km² it is considered as high-density area as per UN.

High-density Area Rules for Other Facilities: If an educational facility, assembly building, hospital, nursing home, or board and care facility is located within 1000 feet (300 m) of a wellhead, high-density area rules shall apply.

Incident: An undesired event that has caused or could have potentially caused personal injury and/or damage to assets, production or harm to the environment or company reputation.

Inclement weather: An environmental condition which may affect the safety of the personnel, operation, and equipment, if precautions are not taken to protect against the hazard. Inclement weather condition includes high wind, sand storm, poor visibility, lightning, torrential rain leading to flash flooding etc.

Industrial Non-Disabling Injury: Is any on-job work related injury, which requires medical treatment only, without causing disablement.

Job Safety Analysis: Job Safety Analysis is a tool to analyse each job by breaking down into a sequence of steps/tasks identifying potential hazards as well as assessing the

degree of risk against each step and accordingly recommend precautionary measures to control the risk before the job is performed. It is also referred as Job Hazard Analysis.

Journey management: A planned movement of people and equipment from one place to another including communications, route, scheduled stops, hazard warnings, provisioning, break-down and other contingency.

Lock-out: A process to use a positive means such as lock to hold an energy isolating device(s) in a safe or “off” position. It provides protection by preventing machines or equipment from becoming energized. These are positive restraints that one cannot remove without a key or other unlocking mechanism.

Loose Lifting Gear: Lifting hardware such as hooks, shackles, turnbuckles, swivels, pear links, master links, D-rings, wedge sockets, snatch / hook blocks, beam clamps, drum lifters, clamps used to lift and handle steel plates and shapes, eye bolts, pad-eyes and lifting attachments used to handle and secure all types of large hoses, and other miscellaneous hardware used for lifting, securing, or suspending loads.

Lost Time Injury (LTI): A fatality or lost workday case. The number of LTIs is the sum of fatalities and lost workday cases.

Lost Workday Case: Any work-related injury other than a fatal injury, which results in a person being unfit for work on any day after the day of occurrence of the occupational injury.

Mast: The stationary structure or component of a rig that supports the crown block, traveling block and hoisting lines.

Monkey board: Platform on which the derrick man works during the time a trip is being made. Also, monkey board referred to as the tubing board or racking board on well servicing rigs.

Motor Vehicle Accident: An undesired occurrence involving a motor vehicle that results in damage to the vehicle, property damage or injury to people. Motor Vehicle Accidents

shall be classified according to the severity of injuries or damages associated with each motor vehicle.

Motor Vehicles: Shall include light and heavy vehicles upon which or by which any person or material may be transported upon a roadway. A motor vehicle is defined as a vehicle which runs with an internal combustion engine and is mobile. Forklifts, man-lifts, vehicles on rails and bicycles shall be excluded. In addition to this, the vehicles which are not capable of moving with a speed of more than 16 Km/h shall be excluded from the list of motor vehicles.

Mouse hole: The mouse hole is the storage area on the drilling rig where the next joint of the drilling pipe is held until needed. This hole is on the floor of the rig, bored into the earth for a short way, and usually lined with a metal casing known as a scabbard.

Near Miss: An unplanned or uncontrolled event or chain of events that has not resulted in harm.

Non-Essential/Pre-Move Loads: Rig load that can be moved at any convenient time during the rig move. Rig loads that are not required for finishing/completing the well and which therefore can be moved to a new location prior to rig release, but after location inspection and a release letter from XYZ. (E.g. Pre-Mix tanks). Usually, those non-essential loads are pieces of equipment that can be rearranged at the rig site to expedite the rig move process.

Operator: A trained and experienced person who operates lifting, shifting and material handling equipment. He should be minimum 21 (twenty-one) years of age. The operator shall be skilled and possess 3rd Party training certificates for the equipment he is assigned to operate. Additionally, the lifting and shifting operators must be capable to demonstrate their skill and competency to their supervisors satisfactorily. Besides, the operator shall possess valid license to drive the prime mover (in case the lifting, shifting and material handling equipment is driven on road).

Perforation: Making holes in pipe, cement, or formation at desired depths usually performed with an explosive device.

Pre-job meeting: A meeting held by the workforce at the workplace to discuss the HSE hazards that may be encountered during the work and the procedures that are in place to successfully manage these hazards. Usually held at the start of the day's work, it is a part of the process of continual awareness on HSE matters.

Priority Loads: Rig Loads that are essential to power up the rig and spud the well at the next well location without affecting the operation at the present well site.

Rig Down: Lowering of mast, sub-structure or another associated rig equipment prior to rig move.

Rig Move: All the tasks being held to move the rig from one location to another, such as rigging down, transport of the rig and associated rig equipment, and transport of the main camp and rig site camp.

Rig Up: Raising of mast, sub-structure or another associated rig equipment after rig move.

Rigging-up: The on-site erection and connection of the components in preparation for drilling or well servicing operations.

Risk: The term Risk in this procedure refers to Safety Risk only. It is the likelihood of a hazard occurrence resulting in an undesirable consequence. Risks can be expressed in terms of the impact of consequences and probability or frequency.

Safety Data Sheet (SDS): A sheet issued by a manufacturer of chemical substances that sets out the risks likely to be encountered by those who come into contact with the substance and emergency mitigation and first aid measures in case of adverse conditions.

Tag-out: It is a prominent warning sign tag that an authorized person fastens securely to energy isolating devices to warn the workers not to re-energize the machine while it is under maintenance or servicing.

Toolpusher: The employee of a drilling Contractor who is in charge of the entire drilling crew and the drilling rig. Also called a Drilling Foreman, Rig Manager or Rig Supervisor.

Trauma: A physical injury, wound, psychological shock or distress caused to an individual by an external force.

Truckpusher: The rig contractor or their sub-contractor supervisor responsible for the transportation and movement of the rig and associated equipment, including camps, from one well location to another well location.

Unsafe Act: Any undesired behaviour or human error of a company/contractor employee in the workplace that may contribute to the occurrence of an incident.

V-door: The opening in the derrick leading from the derrick floor to the catwalk and pipe rack area.

Workover Rig: Equipment and machinery assembled primarily for the purpose of any well work involving pulling or running tubular or sucker rods to include but not be limited to re-drilling, completing, recompleting, workover and abandoning operations.

2. KEY RESPONSIBILITIES

2.1. GROUP MANAGERS

Accountable for ensuring that the operations are carried out in compliance with the procedure, under their respective control. Demonstrate HSE Leadership Commitment in every activity and encourage all those involved in the implementation of best safe working practices in order to achieve incident and injury free working environment.

2.2. TEAM LEADERS

- Ensure the implementation of requirements mentioned in *XYZ GE 011* applicable to concerned Group activities under their sole control;
- Ensure XYZ and Contractor HSE KPIs are implemented;
- Ensure the implementation of the approved HSE plan by the Contractors. Follow-up with the Contractors for the implementation of HSE requirements mentioned in bridging document;
- Be a key functionary in implementing XYZ HSE policies and procedures and emergency management coordination;
- Evaluation of the Contractors monthly HSE performance reports and KPI reports providing feedback on improving the conditions based on Contractor HSE KPI guidelines;
- Discuss HSE issues in the daily meetings as a priority item to promote HSE culture;
- Ensure HSE inspections are carried out periodically at rigs. (Please refer to **Annexure 16** - Rig HSE Inspection Checklist);

2.3. DIRECTORATE HSE TEAM

- Guide and advice the concern Groups under Directorate on the implementation of the procedures and regulations;
- Review the procedure periodically to incorporate new developments;
- Develop functional procedures as required to guide on HSE related matters;

- Conduct on job and class room awareness session for XYZ rig Supervisors, Engineers and Contractor Staff on XYZ HSEMS;
- Conduct HSE inspections and participate in Audits initiated by the HSE Group;
- Organize periodic Contractor HSE meetings and trainings as required;
- Support investigating incidents occurring in the operations;
- Compile and correlate data required for HSE Group;
- Monitor the status of action items for Non-conformities for audits, investigation report recommendations, inspections, etc. periodically;
- Develop and monitor annual HSSE KPMs and Contractor HSE KPIs in coordination with Groups.

2.4. DRILLING AND TECHNOLOGY (D&T) GROUP/HSE ENGINEERS/HSE SUPERVISORS

- Conduct on job awareness session for XYZ rig Supervisors, Engineers and Contractor Staff on XYZ HSEMS;
- Participate/facilitate Audits initiated by the HSE Group and HSE (D&T) Team.
- Conduct HSE inspections;
- Ensure that Contractor HSE personnel performance shall be carried out as per the guideline developed;
- Provide necessary HSE information to Superintendent of contract for issuing Contractor HSE performance report by the controlling team at the end of the contract;
- Participate and support the incident investigations from incidents occurring in the operations;
- Support the Operational personnel for carrying out the operations safely and provide assistance in implementing XYZ HSEMS Procedures. Monitor the status of action items for Non-conformities for audits, investigation report recommendations, inspections, etc. periodically;
- Ensure annual HSSE KPMs and Contractor HSE KPIs are implemented and Monitor the same;
- Ensure support to Directorate HSE Team as required.

2.5. XYZ DRILLING SUPERVISOR

- Oversee effective implementation of relevant XYZ HSEMS procedure and Contractual requirements at the worksite;
- Responsibility for site level emergency response;
- Report all incidents occurred at the site using HSE Live and conducts a preliminary investigation;
- Conduct safety tours/inspections;
- Participate in HSE meetings, support and follow up other HSE Inspection/audits and Corporate/Directorate HSE initiatives and programs approved by the Groups.
- Implement PTW System for Drilling Operations;
- Conduct pre-spud HSE inspection;
- Monitor compliance with Personal Protective Equipment by personnel at rig site;
- Monitor and follow-up on the Hygiene inspection recommendations at rig and camp;
- Monitor the implementation of XYZ waste Management Procedure and Plan and follow-up on the inspection reports with Contractors. Authorise to STOP work at rig site upon observing any unsafe acts, unsafe conditions, near misses, incidents, etc., which has high risk, during rig site activities including operations involving service Contractors, SIMOPS coordination and activities involving other XYZ Asset Teams/Groups;
- Ensure to report all HSE issues to Controlling Team.

2.6. ASSET HSE TEAM

- Interact with HSE (D&T) for further follow up with Drilling Groups during any hazardous operations (well testing, flaring, venting, emergencies etc.,) which have an impact on operations;
- SIMOPS and Risk Assessment coordination with the drilling rigs under operations near to the GCs and construction activities;
- Participate during the well site selection;

- Ensure and coordinate PTW & excavation notification for site preparation issued by the concerned Asset Team as per XYZ HSEMS procedure;
- Coordinate with concerned asset operation teams to ensure the workover & drilling well site handover & taking over process as per this procedure.

3. HSE PROCEDURE

3.1. GENERAL HSE INFORMATION

This general information is commonly applicable for Drilling and Workover Operations and should not be applied to other activities inside XYZ, such as Seismic or Production.

3.1.1. HSE MANAGEMENT SYSTEM

A. HSE POLICIES

XYZ HSE policy, driving policy, no smoking policy and Contractor's HSE policy shall be displayed at various locations and offices in English and Arabic.

XYZ Supervisors at the work site shall understand the HSE policies, relevant HSE Management System procedures and contractual requirements. Contractor HSE plan document to be available for reference to ensure that the HSE requirements are compiled by the Contractor and implemented effectively.

B. ANNUAL HSE KPIs (KEY PERFORMANCE INDICATORS)

Annual HSE Objectives (KPIs) shall be determined by the Directorate for its Groups/Teams (with their participation), Contractors, and communicated. KPIs shall be monitored.

C. LEADERSHIP HSE VISITS

To demonstrate their commitment towards HSEMS implementation, the XYZ management personnel (Team Leader and above) shall audit the work places as per D&T Directorate Leadership Visit Program. They shall ensure that the observations made during such audits are addressed appropriately.

D. CONTRACTOR HSE MANAGEMENT

Contractors HSE pre-qualification and evaluation process shall be in place and implemented.

Contractor shall prepare the HSE Plan for all the activities of drilling and workover and submit for approval by XYZ prior to the mobilization work. HSE and emergency response roles of the key personnel shall be clearly defined in the HSE Plan. The Plan shall include subcontractor HSE management as well. The HSE plan shall be implemented and updated whenever there is any change required due to an incident, hazard observation, and management of change, amendments to regulatory requirements, XYZ notifications, and policies and updated international codes/standards.

The Contractor shall have the approved standard operating and maintenance procedures relevant to the operations and shall train the personnel in respective trades and on the job-specific requirements. The Contractor shall produce the documents as and when required by XYZ.

Contractor shall comply with the HSE requirements of Contract, XYZ HSEMS, and associated procedures. Any HSE issues which are ambiguous shall be discussed, agreed and documented as bridging document for clarity in implementation.

The Superintendent of Contract shall verify the implementation of relevant HSEMS and contractual HSE conditions through periodic HSE performance reviews. The Directorate HSE Team shall support the process.

E. HSE PERSONNEL

The D&T Directorate, as well as the Contractor, shall appoint competent HSE personnel to guide, advice and assist the operation teams in implementing the HSEMS and the approved HSE Plan for the activities.

The Contractor shall appoint at least one Safety Officer per each drilling workover rig, as a minimum.

The qualification, experience and the competency levels of the Contractor Safety Officer shall be verified and approved by the concerned Superintendent of Contract and HSE (D&T) Team in accordance with Contractor Safety Officer Evaluation Criteria.

F. HSE MEETINGS

Effective means of communication of HSE issues such as procedures, HSE targets and improvements, reporting, suggestions, etc., shall be established between D&T, Contractor and sub-Contractors and other interested parties by means of conducting periodical HSE meetings at all levels. The HSE issues discussed in the meetings shall be appropriately addressed.

G. COMPLIANCE TO REGULATIONS

Applicable HSE statutes, rules and regulations of Kuwait shall be identified and recorded. Legislations register relevant to operations at drilling and workover shall be prepared by HSE (D&T) Team. Applicable HSE statues, rules and regulations of Kuwait shall be implemented by all.

H. RISK MANAGEMENT

Risks associated with drilling and workover operations shall be identified and evaluated. Appropriate mitigation measures to minimize the risks to As Low As Reasonable Practicable (ALARP) levels shall be defined and implemented. D&T Directorate shall develop, implement and maintain risk and environmental aspect register for all the activities.

I. PROCESS SAFETY MANAGEMENT

Develop and establish Process Safety Management System. Ensure the Contractor complies with the testing, inspection and certification of the equipment, material and integrity of the services. Contractor shall maintain critical spares to ensure safe operations.

J. INSPECTIONS AND AUDITS

Establish site HSE inspections mechanism to check and correct substandard actions/practices and non-conformance to standards. The inspections may be of scheduled or unscheduled type. Observations made during the inspections shall be

forwarded to the concerned controlling team for corrective action by Contractor within the time frame which is based on the level of risk involved.

Periodic HSE Audits shall be conducted to check the XYZ and Contractor HSE performance and management review of the system to ensure continual improvement.

K. PERSONAL AND OTHER PROTECTIVE EQUIPMENT

Personnel working on or visiting the site shall require PPE such as hard hat, safety goggles, safety boots/shoes, long-sleeve coveralls, etc. as per XYZ standards. Damaged PPE shall be replaced immediately.

Personnel entering high noise areas (which shall be notified and signage displayed) shall use ear protection. Personnel working in dusty areas shall use dust masks.

Personnel shall not wear jewellery or other ornaments that are likely to entangle with equipment or interfere with work and cause injury.

Personnel with hair of such length as to be a hazard in work areas should keep it contained in a suitable manner while performing their duties. Hair and beard styles shall not interfere with the effective functioning of the head, eye, face or respiratory protective equipment, if such equipment is required to be worn at the work site. Appropriate approved PPE shall be provided for that personnel with long hair/beard etc.

Persons working at a height more than 1.8m (6ft), which is likely to cause serious injury due to an accidental fall, shall be protected by a full-body harness with fall arrest systems.

The anchoring point shall be capable of supporting a minimum dead weight of 2,268kg (5000lb).

Enough spare PPE shall be available at the rig stores.

L. EMERGENCY RESPONSE

Every work site/rig location shall have a site-specific Emergency Response Plan specifying the actions of key personnel for various emergency scenarios such as well control emergencies, fire/explosion, H₂S contingencies, oil spill contingencies, personnel evacuation, medical evacuation, next of kin notification, expatriate evacuation to their place of origin etc. The response plan shall identify the emergency contacts, logistics and other resources to facilitate effective handling of emergency situations.

Emergency Response Team personnel shall be trained on their roles and responsibilities. Emergency Response Teams and site personnel shall be trained and re-trained by means of conducting drills for various scenarios. Schedules for drills shall be prepared and implemented. The drills may be either on advance notification or on an unscheduled basis based on the inspection strategy applied.

Adequate resources such as communications, ambulance, emergency medicines, rescue and first aid teams, approved medical personnel, emergency contact lists, hand held radios and base radios to handle the emergencies shall be made available at the site as appropriate.

The Contractor/operator shall keep the contact details of the next-of-kin for intimation.

Procedures for repatriation of the deceased or the injured expatriates for treatment shall be prepared and communicated to the key personnel in the organization.

M. INCIDENT REPORTING

All incidents including near misses shall be reported through LiveHSE. The observer (XYZ or Contractor Employees) of an incident should take reasonable measures to contain the incident preventing further damage or harm and inform ERC (Emergency Response Control Centre (115) immediately and subsequently is responsible for immediate reporting of HSE incidents to the immediate supervisor. Simultaneously the incident including near misses is to be reported through LiveHSE within 24 hours of incident occurrence for all and Minor (Level 1) incidents. However, for Level 2 (Moderate) and

Level 3 (Major) incident, it shall be reported in LiveHSE as well as through the prescribed Preliminary Incident Report format to respective Asset/Directorate HSE Team.

All incidents if necessary are reviewed and updated in MyHSSE based on the consequences, by the end of working shift in which the incident came under control.

N. PERMIT TO WORK SYSTEM

The 'Permit to Work' (PTW) Procedure is a formal written system that utilizes a document (Work Permit) to control work by means of potential hazard identification and risk assessment. The work permit is also a means of communication among various Supervisors or their representatives belonging to Operation, Maintenance, Controlling Teams and Contract personnel, who are involved in work preparation and/or its execution.

The system is intended to ensure personnel and environmental safety as well as plant and equipment integrity. The work permit is not simply a permission to carry out the job, rather it is a cornerstone for a safe system of work, which determines how that job can be carried out safely.

A work permit is not just an exercise in form filling. Your signature on Work Permit confirms your responsibility towards the safe preparation and execution of the work.

Unless XYZ and Contractor have signed a memorandum of agreement (Appendix B) allowing the use of Contractor Permit to Work System, any operation or task that needs to be performed under a Work Permit shall refer to *XYZ SA 004 – Permit to work procedure*.

3.1.2. HSE INDUCTION

Persons entering the site for work or visit shall be inducted with safety instructions to be followed while on site. Every new employee of XYZ or Contractor shall be given a comprehensive HSE induction. Persons promoted in their job position shall be inducted with the HSE responsibilities in the new assignment.

The contents of the visitor and new employee induction shall be specified in the HSE Plan by the Contractor, approved by XYZ and, based on industry recommendations and learnings, shall include but not limited to:

- Company HSE policy;
- Emergency, fire and evacuation plan;
- First-aid facilities;
- Toilets and changing rooms;
- Mess room;
- Environment and waste disposal;
- PPE policy;
- Drugs and alcohol policy;
- Smoking policy;
- Mobile phones policy
- Incident reporting;
- Safe Systems of work (Work Permits, Isolation certificates, LOTO).

3.1.3. EOD – EXPLOSIVE ORDNANCES DISPOSAL

Due to the fact that is still buried unexploded material resulting from the invasion war on the 90's, work shall only be started in areas that have EOD clearance.

Even in EOD cleared areas, there is the possibility of explosive presence. The following precautionary measures shall be followed to protect from the danger:

- Do not touch the suspected ordinance;
- Stop the work immediately, clear the area and inform all personnel of the danger;
- Note down the location of unexploded ordnance or suspected object, and place visible markers at a safe distance;
- Inform Emergency Response Centre at phone no. 115 immediately.

3.1.4. LAND TRANSPORTATION AND ROAD SAFETY

All vehicles shall be checked and cleared for their operations. Vehicle servicing must be performed at least according to the manufacturer's requirement and at the appropriate time, distance and driving condition intervals specified in the vehicle's Owner Manual and shall be documented.

All vehicles shall be fitted with seat belts for all seats, portable fire extinguishers, and first aid box. Vehicles entering within 30m (100ft) of the well bore shall have a spark arrestor.

Compliance to speed limits shall be monitored through speed monitoring devices inside Company XYZ field roads.

Portable Global Positioning System (GPS) is recommended to be provided in Ambulances and all vehicles moving to the site, camps, wells and other remote locations.

Vehicle parking places shall be designated at the rig site and always the vehicles shall be parked in reverse. No vehicle shall be allowed inside the rig site unless permitted.

All the personnel driving vehicles for official work shall be trained in defensive driving techniques. It is mandatory that all the personnel driving the vehicles to have a valid Kuwait driving license. Drivers shall rest for at least 8hours per day at undisturbed and suitable place.

3.1.5. LIFTING EQUIPMENT

All cranes and lifting devices shall be of approved type, load tested and certified for use. All loose lifting gears including slings shall be inspected, once every six months, by qualified third-party inspector (API Certified) or one able to certify under Lifting operation and Lifting Equipment Regulation (LOLER), 1998 of United Kingdom.

The detailed examination and certification shall be performed by a XYZ accredited third parties.

Each facility that has rigging equipment to move loads shall maintain a Lifting Gear Register. All lifting gear issued and in use shall be documented in the Lifting Gear Register.

New lifting gear stored as spares are not required to be logged in the Lifting Gear Register until they are issued and put in use. Lifting gear must have an electronic or paper copy of the proof load certificate on file that is provided by the manufacturer.

When slings and loose lifting gear are damaged, destroyed or removed from service, the register must be updated.

When slings and loose lifting gear are rejected by the third-party inspection agency a separate rejection certificate shall be maintained and all rejected lifting devices shall be discarded from the rig site immediately.

Also damaged, destroyed or removed from service, the register must be updated.

Proof Load testing of lifting equipment shall be carried out at least once in a continuous period of 12 months or after substantial repairs have been carried out on the equipment, whichever is earlier. The testing shall be done by an accredited third-party testing agency.

Lifting devices shall be colour coded as per the above table and a procedure to change the colour coding every time the devices are inspected and certified shall be in place. A notice board indicating the colour coding of devices shall be displayed at the site. Pre-use inspections shall be performed on lifting equipment before each use. Lifting equipment that is found to be defective or unsafe for use shall be discarded.

		JANUARY TO JUNE	JUNE TO DECEMBER
Even Years	2018 2020 2022 ...	Yellow	White
Odd Years	2017 2019 2021 ...	GREEN	BLUE

Table 1 - Colour Code scheme

Cranes or any other lifting equipment with safety controls not functioning shall be suspended from service. The safe working load (SWL) shall be clearly marked on the equipment/devices.

Lifting devices failed in the inspection shall be cut into pieces and discarded and tracked down on the Lifting and Rigging Equipment register as out of service equipment.

3.1.6. WORK SCHEDULES

Stress and fatigue are often contributing factors to many accidents.

The maximum working hours per day shall not exceed 12 hrs. Personnel should be rested for an equal number of hours that they worked. The working hours may be conveniently scheduled during peak summer season, so that field crew shall not be badly exposed to extreme weather conditions.

The senior crew on rigs (Assistant Driller/site Safety Officer and above) shall work on rotation for 28 days on-duty and 28 days off-duty cycle. Junior staff (including site medic) shall work for 56 days on-duty and 28 days-off duty cycles.

3.1.7. MINIMUM LANGUAGE SKILLS

The crew should be able to understand HSE information and risks in their respective operations. The senior crew of rig and service company crew shall be able to write, speak, read and understand Basic English language.

3.1.8. NIGHT OPERATIONS

Certain critical operations such as working at height (except routine work operation on derrick), heavy lifting operations (such as rig move), mobilization of heavy equipment and driving (except between camp and rig) during night/dark period to be carried out as per Contractor HSE MS procedures and with adequate illumination. Vehicle operations in dark shall be discouraged unless it is highly essential or in case of emergency.

Night operations specific to detonating explosives during well completion or usage of radioactive sources for logging the well is prohibited.

3.1.9. INCLEMENT WEATHER

Work shall be suspended during the inclement weather conditions when such conditions are likely to cause harm to the people if they continue to work.

As a general recommended practice, work at height such as working on the derrick, scaffolding, man rider winch, man lift, man baskets, operation of crane and welding works shall be suspended when the wind speeds exceed 30km/h. (20mph). In case of cranes, the operation shall be stopped, boom to be lowered and secured.

An anemometer is to be installed at the rig site to record the wind speed or information to be obtained from a reliable source located sufficiently close to the worksite to assure the accuracy of the indicated wind speed.

3.1.10. ENVIRONMENT MANAGEMENT PLAN

An Environmental Impact Assessment shall be implemented for the drilling projects as per the Kuwait Environment Public Authority regulations (KEPA).

An Environment Management Plan shall be developed by identifying the environmental aspects and impacts of all activities related to the drilling and workover operations.

Waste Management Plan to include collection, segregation and disposal procedures of hazardous wastes such as used lubricating oils, sewage waste, e-waste, and non-hazardous wastes such as wood, paper, kitchen waste or office waste.

The Environmental Management Plan shall provide practices and procedures to properly address potential environmental concerns related to Drilling and Workover activities such as:

- Air Quality and Dust Control Plan;
- Noise Control Plan;
- In-land Oil Spill Contingency Plan/ Chemical Spill Clean-up Plan;
- Effluent Water Disposal Pit Closure Plan;
- Land Restoration Plan;
- Resource conservation.

3.1.11. TRAINING AND COMPETENCY

Personnel engaged in operations shall be competent to perform the jobs entrusted to them. The competency of the senior drilling personnel on critical activities shall be verified by the Controlling Team prior to their deployment on work and copies of approval to be maintained at the rig.

Position and trade competency such as basic qualification, professional certification, training, basic language skills, physical fitness etc. shall be defined and documented. Job descriptions shall clearly specify the above requirements as well as the HSE responsibilities and accountabilities of the position.

The new employee or the promoted shall be closely monitored by their immediate supervisor until the person attains the required level of competency in their job.

Posters to be displayed on all strategic location for awareness.

Tool-Pushers, Drillers and Assistant Drillers shall have appropriate and valid IWCF/IADC Well Control Certification. Necessary Original Equipment Manufacturer (OEM) training on Emergency Disconnection Sequence (EDS) shall be provided to the senior crew as applicable.

All the junior crew shall have IADC rig pass or equivalent certification from IADC accredited institution.

Welders working on the rig shall have a valid certificate.

All personnel on the rig or entering rig site shall have valid certification for entering areas with presence of, or potential for, H₂S gas.

Fire Teams and First Aid Teams shall be trained to assist rescue and firefighting by using available resources and help rig medic on extending first aid to the casualties.

The medic on the rig shall be qualified or licensed paramedic/Certified Medic approved as per criteria "Approval process of rig medic by Ahamadi Hospital" developed by HSE (D&T).

A training passport shall be maintained by XYZ and XYZ Seconded employee and all the training imparted should be entered and updated. Training records and tracking system shall be made available by all Contractors.

3.1.12. FUEL STORAGE

Drilling and Workover operations require high volumes of fuel being used daily and therefore needs to be stored at the rig site. In general, each land rig has stored 500bbl (79500 L) of mud fuel and 400bbl (63600 L) of diesel.

Flammable liquids shall not be stored within 45m (150ft) of the well bore except for fuel in the tanks of operating equipment.

As a minimum, 2X63kg trolley mounted DCP extinguishers ABC type, and 2x12kg DCP ABC type portable extinguishers shall be provided within an accessible point for use in case of fire.

Storage tank and equipment/vehicles during transfer of fuel shall be adequately grounded separately and the filling hose shall have electrical continuity to ensure dissipation of static current. The area around the storage shall be marked as "No

Smoking & No Naked Flames Zone". A Hot work permit shall be issued for any hot works in the area.

Spill control measures while refuelling such as using drip trays and spill control kit shall be in place.

Approved Safety Cans (metallic) fitted with flash back arrestors shall only be used as hand portable containers for storing/handling/transporting flammable liquids.

The storage tanks shall be fitted with:

- Level indicators to know the volume of the contents of the tank.
- Air breather with flash back arrestor
- Over flow line
- Access/egress ladder

Storage tanks shall be placed on a hard surface having adequate load bearing capacity.

All tanks and containers shall be labelled as per standards. All storage tanks and road tanks shall be marked with their capacities. Safety precautions shall be displayed in the storage/loading/unloading area. Loading/unloading procedures to be available.

Storage tanks shall be lifted and transported completely emptying from contents.

Loading/Unloading/transferring operations shall be closely monitored by an authorized supervisor and under a PTW.

3.1.13. EXPLOSIVES

All relevant laws governing the storage, transportation, and use of explosives shall be known, available and complied with.

All personnel handling explosives shall be certified to perform the task.

The distances of explosives storage facilities from other structures, buildings, and infrastructure shall meet the requirements of XYZ standards.

Magazine shall be of sound construction, adequately earthed, controlled access, temperature extremes controlled and security guarded.

Procedures shall be in place for explosives transportation which includes route planning, journey management, parking regulations, smoking rules, safe distances etc.

No transportation permitted during thunderstorms. No night transportation of explosives permitted.

Driver shall be trained on precautions while transporting explosives.

Explosives and detonators shall be transported separately. Vehicles shall be equipped with spark arrestors to the engine exhaust and batteries shall have positive isolation switches.

Vehicles shall have "Explosives" marking along with signage.

The vehicle shall be equipped with a portable fire extinguisher.

There shouldn't be any unnecessary passengers on board travelling in the vehicle.

All operations involving explosives shall be carried out through PTW. Pre-job meeting shall be conducted.

Use of explosives shall be carried out by an authorized person only. A register of explosives shall be maintained by the authorized person.

Explosives and detonators shall be stored separately in magazines with proper labelling. At the site, the explosive magazines are stored at a safe designated place, barricaded & signage placed. Explosives shall not be stored in the transport vehicle.

Radio silence shall apply while working with explosives. Recommended minimum distances between the shot point and transmitter are as per IME (Institute of Makers of Explosives) publication 20, which are as follows:

TRANSMITTER POWER (W)	MINIMUM DISTANCE (m)
0-250	150
250-1K	300
1K-10K	750
10K-50K	1500
50K-100K	2300

Table 2-Minimum distances from radio transmitters when using Explosives

3.1.14. CAMPS

Each rig operation shall be associated with a dedicated camp facility which shall be designed, constructed and maintained to protect personnel from extreme temperatures, prevent ingress of insects, and provide adequate ventilation/temperature control, separate bed for each person, adequate sanitation and laundry facilities. Porta-cabins shall conform to XYZ C 035 - *XYZ Standard Specification for Porta Cabins*, as applicable.

The camp shall be located at distance from the respective rig operation as specified in the contract.

Camp lay out indicating the locations of muster points, fire extinguishers, smoking area, emergency exits etc shall be prepared and displayed in each cabin, galley, and other important locations. Camps to be set in the predominant upwind direction from the rig.

Housekeeping shall be carried out every day. Wash rooms and toilets shall be disinfected every day.

Electrical wiring shall be done according to the XYZ procedures. Electrical circuits shall be protected against over-current by automatic tripping devices Earth pits shall be maintained and checked periodically. Carry out maintenance on electrical systems through PTW and LOTO by an authorized electrician.

Catering Contractors shall have Food Safety Program as per Hazard Analysis and Critical Control Program (HACCP) or equivalent certification.

Kitchen, food storage, and dining facilities shall be maintained with absolutely hygienic condition. Food stuff with expiry date falling in a month time shall be discarded as a precautionary measure. Kitchen staff including helpers shall be provided with head caps, hand gloves, uniform and shoes. Keep the floors always dry. The eating place shall accommodate at least 50% of the personnel living in the camp at any point in time. Food waste shall be disposed of as per the *XYZ.EV.008 – Waste Handling Procedure*.

Superintendent of Contract shall ensure that the catering staff including camp-boss shall follow 56 days on-duty and 28 days off-duty cycle as applicable for the junior staff.

All the catering crew shall be trained in basic firefighting and the camp boss to obtain the certified first aid training.

Fuel storage and fuelling station shall be at least 45m (150ft) and located downwind from the camp residential block and galley. Adequate safety measures shall be taken for LPG cylinders storage and usage. LPG cylinders shall be stored in cool and well-ventilated place and shall not be stored in quarters or other occupied areas. Designate a place for vehicle parking.

As a minimum, manual fire alarm system shall be installed for each camp. Smoke detection system shall be provided in the individual cabins.

Fire extinguishers shall be placed in the kitchen, electrical panels, Fire water pump, water headers and enough fire hose reels shall be provided. Periodic inspections shall be carried out.

Emergency plan for the camp shall be in place and mock drills shall be conducted periodically at the camp site.

Recreational facilities such as indoor/outdoor sports and television shall be created in camp as a measure of stress relief & relaxation to the personnel.

Camp security wherever posted shall be organized properly by providing shelter with air conditioning facility.

Adequate drinking water adhering to quality standards as per “Appendix 16 of KEPA – Un-bottled water”, shall be provided at camps and work locations.

The catering staff shall have a valid medical health card issued by Ministry of Health, Kuwait. Catering staff, including helpers, should be medically examined before initially commencing work and every time they join back to duty after their field break. They should be free of contagious diseases, cuts, sores and colds when handling and preparing food. Persons with infections shall not be permitted to catering activities. Rig medic shall physically check them in the camp for any skin or bodily infections at least once in a week.

A first aid kit, adequate number of fire extinguishers and at least two fire blankets (non-asbestos) shall be made available in the kitchen.

Hazardous and Non-hazardous waste generated in the camps shall be disposed of as per the *XYZ EV 008 – Waste Handling Procedure*.

Sewage waste shall be disposed at a designated facility, if not treated at the site.

Contractor shall analyse the quality of the treated sewage wherever Sewage Treatment Plan exists and submit the reports to Superintendent of Contracts and Directorate HSE on monthly basis.

Contractors to ensure that food waste is stored and disposed of properly so as to prevent the presence of stray dogs.

3.1.15. ELECTROMAGNETIC RADIATION

High tension power lines, radio communication lines, TV transmitters, Radar Transmitters and Mobile transmission towers have electromagnetic lines of force around them which have the potentiality to cause non-ionizing radiation effects on the

personnel or equipment working under their zone of influence. Safe distances from the sources of electromagnetic sources shall be maintained while moving or operating the rig equipment/seismic recording units/vibrating equipment etc.

Electromagnetic radiation monitoring shall be carried out prior to the rig move or rig-up if the area is in reasonable surroundings of any overhead lines. This is to make sure that the operation is carried out in the safe zone.

4. WELL SITE

4.1. WELL SITE CONSTRUCTION/PREPARATION

Drilling Operational Support Team will be the controlling team for site preparation activities including pits and for releasing the new drilling/deep-drilling workover location to rig contractor through a letter for site preparation.

The site preparation for all new drilling and deep drilling workover locations is carried out by handing over and taking over checklist. The handing over of new location between drilling Operational Support Team and Gas/Asset Operations Team will be through filling and signing checklist **Annexure 1** (from Production Operations/Gas Operations/Water Wells Handling Team to Drilling Operations Support Team) and taking over through checklist **Annexure 2** (from Drilling Operations Support Team to Production Operations/Gas Operations/Water Wells Handling Team).

Rig road/access road for the wells locations shall be prepared and maintained by Transport Operation Team in coordination with Drilling Operational Support Team.

Pits and a Cellar with conductor casing installation are to be prepared and completed as per operational requirements prior to the anticipated spud date.

During the site preparation and excavation jobs, the respective civil contractors need to consider the possible presence of physical hazards like underground electrical cables, underground oil and utility piping, and other obstructions.

Upon completion of site preparation Rig Contractors to provide fencing and safety warning signage at the open pits and cellar.

The Pits for water, water-based mud and oil-based mud will be provided with a 2m high removable fence.

Cellar/Wellhead pit to be barricaded with portable concrete blocks (standard Jersey barriers) and removable fence after installing the conductor pipe.

Restricted Area sign boards and Warning sign board shall be placed at each location. Signs to be written in English and Arabic, and clearly visible from a distance. Sign boards to be placed will be in accordance with **Annexure 3**.

Acceptance of new build location shall be as per **Annexure 4**, signed by Contractor's Representative and Company's Representative.

4.2. SITE RESTORATION

Upon completing the Drilling or Workover operations at a location and rig move, Drilling Operations Team communicates the same to Drilling Operational Support Team.

Immediately upon the rig move from well location, rig contractors will initiate for the actions mentioned in **Annexure 5** for securing Well Heads and open Pits during site restoration and pits backfilling process.

Post drilling and upon release of the rig, site levelling and cleaning activity, removal of contaminated waste soil due to rig contractor activity and other contractor waste from rig site, and disposal of waste from cellar pit upon rig move, shall be carried out by rig contractor. If excavation is required for the job, these excavation activities need to be done through implementing *XYZ SA 004 – Permit to Work Procedure* and *XYZ SA 026 – Excavation Safety Procedure*.

Drilling Operational Support Team will communicate to who prepared the well location for site restoration by:

- Back filling of waste pits, Workover site near and far pits;
- Site compaction and further restoration equivalent to surrounding soil;
- Fencing of any surround waste pits to be ensured upon completion of site restoration till pits are back filled by rig contractors.

For the drilling and deep drilling workover well locations prepared by Rig Contractor, Drilling Operational Support Team will communicate to rig contractor who prepared the well location for site restoration by:

- Back filling of fresh water pits and water-based mud waste pits;
- Removal of plastic liners from pits prior back filling;
- Site compaction and further restoration equivalent to surrounding soil;
- Fencing around OBM pits to be ensured upon completion of site restoration until OBM pits are back filled by contractors.

After site restoration and completion, **Annexure 6** to be filled and signed by the concern Transport Operations Re/Rig contractor and the Drilling Operations Support Team/Transport Operations Team representative.

For the Heavy oil drilling and development workover, well locations prepared by rig contractors with the drilling operations team oversight, site restoration and completion will be initiated after completion of operations upon rig move and prior the spud of next well.

4.3. SAFE DISTANCES

Minimum distance requirements shall be followed when considering a new location of a well/wellhead for Exploration or Development drilling.

4.3.1. WELLHEADS FROM FACILITIES FOR DEEP DRILLING & WORKOVER RIGS INSIDE/OUTSIDE XYZ FENCE

EXPLORATION DRILLING	
FACILITY	MINIMUM DIST. FROM WELLHEAD (m)
Public Road (XYZ/Non XYZ black top), farms, buildings (non XYZ), camps (public), Hospital, Schools and Community Centres	640
Overhead powerlines	150
Above ground flow lines, utility lines and existing wells	130
Gathering Centres and other production facilities (to nearest boundary of the facility)	210

Table 3 - Safe distances for DD& WO Inside/Outside XYZ fence - Exploration wells

DEVELOPMENT DRILLING – NORTH FIELDS (NF)	
FACILITY	MINIMUM DIST. FROM WELLHEAD (m)
Public Road (XYZ/Non XYZ black top), farms, buildings (non XYZ), camps (public)	250
Overhead powerlines	150
Above ground flow lines, utility lines and existing wells	130
Gathering Centres and other production facilities (to nearest boundary of the facility)	210
Hospital, Schools and Community Centres	500

Table 4 - Safe distances for DD&WO Inside/Outside XYZ fence - Development wells (NF)

DEVELOPMENT DRILLING – SOUTH & EAST FIELDS (SEF) AND WEST FIELDS (WF)	
FACILITY	MINIMUM DIST. FROM WELLHEAD (m)
Public Road (XYZ/Non XYZ black top), farms, buildings (non XYZ), camps (public)	160
Overhead powerlines	150
Above ground flow lines, utility lines and existing wells	130
Gathering Centres and other production facilities (to nearest boundary of the facility)	210
Hospital, Schools and Community Centres	350

Table 5 - Safe distances for DD&WO Inside/Outside XYZ fence - Development wells (SEF & WF)

WORKOVER OPERATIONS	
FACILITY	MINIMUM DIST. FROM WELLHEAD (m)
Public Road (XYZ/Non XYZ black top), farms, buildings (non XYZ), camps (public)	160
Overhead powerlines	150
Above ground flow lines, utility lines and existing wells	130
Gathering Centres and other production facilities (to nearest boundary of the facility)	210
Hospital, Schools and Community Centres	350

Table 6 - Safe distances for DD&WO Inside/Outside XYZ fence – Workover Operations

4.3.2. WELLHEADS FROM FACILITIES FOR DEVELOPMENT DRILLING & WORKOVER RIGS INSIDE XYZ**FENCE**

DEVELOPMENT DRILLING	
FACILITY	MINIMUM DIST. FROM WELLHEAD (m)
Public Road	45
Overhead powerlines.	150
Above ground flow lines and utility lines	50
Gathering Centres and other production facilities (to nearest boundary of the facility).	90
Hospital, Schools and Community Centres	100
Occupied buildings/Camps	45

Table 7 - Safe distances for Development Drilling & WO Inside XYZ fence – Development Drilling

WORKOVER OPERATIONS	
FACILITY	MINIMUM DIST. FROM WELLHEAD (m)
Public Road	35
Overhead powerlines.	60
Above ground flow lines and utility lines	35
Gathering Centres and other production facilities (to nearest boundary of the facility).	90
Hospital, Schools and Community Centres	100
Occupied buildings/Camps	35

Table 8 - Safe distances for Development Drilling & WO Inside XYZ fence – Workover

4.3.3. SAFE DISTANCE FOR FLARE PIT ON ANY OPERATIONS INSIDE/OUTSIDE XYZ FENCE

FLARE PIT	
FACILITY	MINIMUM DIST. FROM WELLHEAD (m)
Wellhead	30
Public Road	35
Overhead powerlines	30
Buried powerlines	15
Above ground flow lines and utility lines	60
Buried flow lines	15
Population/Camps, Public Roads and fuel storage tanks	95
Oil processing units and crude storage tanks	95

Table 9 - Safe distances for flare pit inside/outside XYZ fence

4.3.4. WAIVER/EXCEPTION REQUIREMENT

In case of potential conflict with the above requirements, an exception to the location requirement above shall be granted by the Operation Groups in consultation with Directorate HSE Team (HSE D&T Team).

A Team shall be formed with members from Asset HSE Team (as required), Directorate HSE Team and concerned Drilling Group for recommending the waiver, considering all HSE requirements. The waiver shall be applicable only to the concerned well/location. The report shall be prepared by concerned Operations/Controlling Team for approval.

Controlling Team in consultation with asset/directorate HSE Team shall determine the appropriate boundary and setbacks for a designated outside activity areas while drilling in the high-density areas¹.

¹ A high-density area shall be determined during the planning stages of a drilling operation, on a well-by-well basis, by calculating the number of occupied building units within a 300m Radius from the well head. If eighteen (18) or more building units/more than 200 personnel working/visiting/living within any semi-circle of the 300m radius, it shall be deemed as a high-density area.

5. RIG MOVE/MOBILIZATION

Rig moving and transportation operations carry different types of hazards from those encountered in normal rig operations.

Pre-planning and coordination of efforts of all personnel involved in the rig moving and transport operations are essential to carry out safe and efficient operations.

5.1. ROUTE SURVEY

Once the next location for Drilling/Workover is identified, Drilling Contractor Toolpusher and Truckpusher shall inspect and conduct rig move route survey of the proposed rig route/road condition of new location prior to rig move planning. After initial route survey by Rig Contractor and upon reporting of any route constraints due to XYZ asset property, rig roads etc., XYZ Rig Supervisor will conduct the route survey along with Contractor Toolpusher.

During the rig move route survey inspection, emphasis should be on the following:

- Physical obstacles (powerlines, flow lines, XYZ and Ministry of Interior security fence, camps, cattle sheds outside XYZ fence, security fence, bridges, designated EOD areas, etc.);
- Road conditions (crossings width, compaction level, sharp bends, road washouts, road traffic, etc.).

Following aspects shall be checked as a minimum while carrying out rig route survey:

- In case of crossing overhead powerlines, enough clearance underneath a powerline. (As per API 54 Section 10.1);
- All corners or junctions in the road/ rig route are wide enough to accept the longest and largest loads;
- Sand accumulation at the road shoulders, to be recorded in the route survey check list by rig contractor for communication to rig move transportation drivers for not driving close through the road shoulders to avoid any incident;

- Any steep/inclination if existing at rig road/ route, need for additional prime mover has to be noted and used as required;
- Water accumulation/slush conditions on the road or in the new well site at the time of the rainy season;
- Verify any obstacle for rig movement due to over-ground / underground services and accordingly assure required precautions from the concerns;
- Ensure that Over ground & underground oil & gas lines & electrical lines and other XYZ property related to production operations are placed at a safe distance from the rig roads/ rig route and provided with permanent fixed barricades & markers (visible in the night);
- Potential traffic conditions and hazards likely to be encountered on the road during rig move to be noted, for developing preventive measures by concerned;
- Any public road or XYZ asphalt road crossings during rig move. It is recommended to avoid crossings and movement on a public road;
- Crossing of XYZ fence, security gate crossings, roundabouts and nearby flare pits;
- When rig move is planned with extended loads beyond the width of the trucks, any potential risk for hitting XYZ or third-party asset and personnel in the rig road has to be checked during road survey, and if any such risk is identified, it is to be noted and addressed appropriately prior to rig move;
- During the route survey, new location shall be inspected and any HSE hazards and risks at location hindering the rig move shall be communicated to the XYZ Rig Supervisor. Corrective actions to be ensured by contractor prior rig move;
- Any other physical barriers and height limits.

The route survey checklist as per **Annexure 7**, shall be prepared by rig Contractor considering all the above minimum requirements and signed by the persons who participated in it. If needed the route survey may be repeated for verification of corrective actions from previous route survey.

5.1.1. PRE-RIG MOVE MEETING

After the route survey has been carried out and all preventive/corrective actions for rig move operational constraints & HSE risks are rectified, Rig Superintendent/Toolpusher will prepare a rig move plan document with filled in, Pre-rig move plan checklist as per **Annexure 8**, Rig Route survey check sheet (**Annexure 7**) and new location map. A pre-move meeting will be called by XYZ Rig Supervisor and shall be held on the rig between the Rig Superintendent Toolpusher, Truckpusher, Contractor/sub-contractor Safety Officer, XYZ HSE Supervisor (Concerned controlling Team field HSE Representative) and the XYZ rig Supervisor prior to rig move. The pre-rig move meeting shall be documented, by filling the checklist as per **Annexure 9**, signed by all participants and made available at the rig site. Such meeting will include but not limited to:

- Review of rig route survey checklist, pre-rig move plan checklist & pre-rig move meeting checklist (**Annexure 7, 8 and 9**);
- The sequence of loading as per the Load-out List;
- Additional equipment needed for the move (i.e. Lifting equipment and their corresponding lifting plans);
- Lessons learned from the last Rig Move and discussion of any rig move related safety alerts;
- Any special inspections (i.e. derrick) or repairs to be completed before moving;
- Any newly recruited worker or employee with limited experience to be assigned tasks appropriate to their experience and ability;
- New location conditions and any potential Toxic releases at new location.

5.1.2. DEVELOPMENT OF WELL-TO-WELL RIG MOVE PLAN

Rig move plan document shall be prepared based on the route survey, critical lifts and priority loads by Rig Contractor and submitted to XYZ Rig supervisor for information, review/ comments and records prior to each rig release. Each well to well rig move plan shall be reviewed by XYZ rig Supervisor and provide comments/ recommendations as needed before the pre-rig move meeting or before the rig release to the new location. The assistance of rig HSE Supervisor may be taken by Rig Supervisors for review of rig move plan during his visit to rig.

Rig move plan document for each rig move shall include following as a minimum:

- Route survey outcome/checklist (**Annexure 7**);
- Pre-rig move plan filled in checklist (**Annexure 8**);
- New location details (location map);
- Approximate number of days/hrs for the rig move;
- The scope of work with day wise breakup if exceeding more than 24 hrs;
- Summary of resources required with day wise breakup;
- List of loads with numbers and updated rig equipment load register/Critical load data sheet (**Annexure 10**);
- Lifting Plans for all Critical Lifts (Odd Loads, Imbalanced Loads, Tandem lifts etc.);
- Rig move project plan (optional);
- Methods and devices for communication;
- Senior Personnel involved (name of the Rig move company/Truckpusher name, contact number, supervisors etc.);
- Shift crew including rig move sub-contractor details for each shift;
- Details of XYZ security gate/public road/fence crossing;
- Distance to be covered;
- The sequence for the move;
- Specification and number of the handling equipment (crane, forklift, trucks, etc.,) required for rig move activities with XYZ clearance certificate (**Annexure 11**);
- Emergencies, Emergency response plans and contacts with telephone numbers of all involved key personnel for the rig move (Rig contractor/Rig move sub-Contractor/XYZ/ERC115/Others);
- Specific risks/control measure related to the rig move;
- Pre-Rig move meeting filled in checklist (**Annexure 9**);
- Other items.

5.1.3. PERMIT TO WORK/JOB SAFETY ANALYSIS/RISK ASSESSMENT

The activities that required work permits for all rig move operations (Rig down, Rig move and Rig up) shall be identified by the rig Contractor and their PTW procedure/ process shall be followed.

XYZ rig supervisor will issue a permit (**Annexure 12**) to Drilling Contractor Toolpusher for rig move and for spud in/ workover at the new well location.

Rig and activity specific JSA/Risk Assessment for all rig move activities shall be developed and implemented along with PTW by rig contractor in consultation with the rig crew and rig move subcontractor. Prior to the specific activities, during pre-job safety meetings, JSA shall be discussed with personnel involved in specific jobs for better understanding. JSA shall be updated/amended for any changes in the plan, personal, equipment and environment.

Ensure that rig specific risk register shall cover the activities/hazards involved in rig move operations and implement the control measures.

5.1.4. LIFTING, LOADING AND UNLOADING

Rig Contractor shall ensure that the critical load data sheet/rig equipment load register shall be developed and maintained as a part of rig specific rig move procedure/manual for all heavy equipment (Mud pump, Substructure, Engines etc.,).

The following shall be mentioned as a minimum for critical load data sheets/Rig equipment load register (Refer to **Annexure 10**):

- Rig equipment description with rig load number;
- Type of convoy to be used in transportation for each load;
- Type of load (wheeled or not wheeled);
- Length, width, and height of the load;
- Gross Weight of the load;
- Truck requirement (Towing truck/LBT/FBT etc.);
- Type of Lifting equipment (cranes, capacity, number etc.,) including lifting gear required for loading/ unloading the load;

- Lifting eyes provided (Yes/No);
- Lifting blocks specification (Load rating, length, Diameter, slinging methods etc.);

All safety equipment on the crane must be present and functional including fire extinguisher, load charts, limit switches and boom angle indicator etc. Tag lines shall be attached to each load for stabilizing the load during loading and unloading.

Loading and unloading operations in the darkness/night shall be permitted only with sufficient illumination in the area.

Safe distances must be ensured while unloading the equipment near the well head.

All lifting equipment shall be in compliance with OSHA Standard 29 CFR or another International Standard recognized by all industry.

5.1.5. CRITICAL LIFTING

The critical lift means a lift that meets one or more of the following criteria:

- More than one crane, in combination, required;
- Loads exceeding 75% of the rated capacity of any one crane;
- Lifts that exceed 50 tonnes in weight;
- Lifts which exceed 30 metres in height;
- Any load dimension exceeds 12 meters or the load is of a complex shape where the COG (Centre of Gravity) is difficult to ascertain;
- Lifts which require full boom extension or maximum radius;
- Personnel lifting;
- Lifts over pipelines, or near overhead electric power lines, where lifting operation can endanger the safety of the plant or crane;
- Lifts where the equipment/load consists of thin/fragile members susceptible to deformation during lifting;
- Loads that will require suspension directly above rigging personnel;

- Lifts that result in loads leaving direct view of the crane operator;
- Lifts where the crane footprint is in operational facilities;
- Loads that are extremely valuable, irreplaceable, or unrepairable;
- Loads that could potentially become damaging to other equipment or utilities;
- Lifts where the safety of personnel and/or equipment are at risk;
- Loads that are potentially unstable in flight;

Any other lifting activity considered as critical by the crane operator.

All critical lifts shall be carried out with proper lifting plan and in direct supervision of Rig Superintendent/Toolpusher. The same to be appended with rig specific rig move procedure and rig specific JSA/Risk Assessment.

5.1.6. SAFETY PRECAUTIONS FOR LOADING/UNLOADING MATERIALS TO AND FROM LB AND FB TRUCK/TRAILERS

Ensure the loads are evenly distributed on the truck to avoid any load movement on the trucks during transportation. Before, leaving the site the driver shall inspect the loads on all sides for the stability of truck and to ensure that no personnel is present near to the truck. It is recommended to use pre and post loading checklist for this purpose. The loading and unloading of material shall be done in the presence of truck drivers.

Loads/ pipes/ tools of uneven lengths shall be stored in an approved metal basket (open skid) and transported.

Beacon lights, Reflective sticker and other hazard indication signs shall be available on the truck to communicate the hazards.

Tanks containing mud, water, and chemicals must be loaded clean and empty in order to avoid instability of loads and leading to trailer/ truck rolling over during transportation.

Mobile storage tanks are exempted from this. Chemicals (Liquid/Solid) transported during rig move shall have appropriate hazard communication chart.

Appropriate equipment (tankers/silos) shall be used for transportation of chemicals during rig move. Trucks loading chemicals must be equipped with Chemical Anti-spill material/kits and relevant Safety Data Sheets (SDS).

5.1.7. RIG MOVE CONVOY

Convoy move is preferred while moving the wide, tall, heavy or otherwise oversized loads. Escort vehicle shall be provided by Rig Contractor/Rig Move Sub-Contractor with designated driver & Supervisor in the front and rear side of the convoy. The list of loads/ rig equipment that is part of rig move convoy shall be listed in the Rig move plan.

If it is necessary to cross any public road/ blacktop road, one signal man/ signaller should be posted with proper communication and flags on each side of the road for traffic coordination with the support from XYZ security Team to stop/alert the public until the convoy crossed the road. Ensure that rig move convoy avoids rush hours on all busy roads.

Rig move shall be conducted during day light only. In case of extreme emergency, rig move during night time shall be carried out after approval from concerned XYZ drilling operations Team after detailed risk assessment and implementation of risk mitigating control measures. Rig Superintendent to be available during the night rig move.

Convoy departure shall be postponed when:

- Dusty;
- Rainy;
- Heavy wind (wind speed >30km/h);
- Foggy weather (visibility <100m).

A designated and visibly identified pilot vehicle will be provided by rig Contractor/ subcontractor to guide, monitor and direct the rig move convoy considering the required precautions during rig move activities.

Similarly, a designated and visibly identified rear escort vehicle will be provided to guide, monitor and direct the rig move convoy safely particularly the traffic approaching from behind.

Rig Contractor/Rig move Subcontractor needs to ensure that escort vehicles (Pickup, SUV etc.,) associated with rig move operation shall be of four-wheel drive.

Convoy speed shall be limited to maximum 20km/hour or OEM recommended speed limits whichever is minimum. Convoy shall be completely stopped if any vehicle needs to overtake the convoy. The convoy will resume only when the clearance has been given after overtaking. During the movement in Convoy, the adequate safe distance shall be maintained between the vehicles in the convoy. During long rig moves, the convoy should be stopped at a safe location at specified intervals, to check the stability of the loads, condition of tires, immediate rest to the crew and other unsafe conditions as observed.

Prior to rig move, Truckpusher shall communicate the pre-identified signals for STOPPING, EMERGENCY, and BREAKDOWN to the drivers and helpers on the convoy. Truckpusher to ensure that the drivers will follow the approved rig move route during the material transportation. No short cuts are allowed.

Extended loads beyond the truck width shall only be permitted with beacon lights, reflective stickers & danger flags or other visible hazard communication signs indicating the extended portion of the load.

Ensure that all overhead cables are to be approached with caution. Rig move has to stop then proceed slowly under the cable to avoid any excessive movement of the rig suspension.

Risks due to opposite direction traffic shall be considered during convoy movement.

5.1.8. RIG MOVE ON PUBLIC ROADS/HIGHWAYS

Rig move shall be carried out in the approved rig roads in XYZ field. However, due to unavoidable/emergency requirements, the rig move convoy on the public road/highway shall meet the following requirement.

- Rig move shall not be conducted during heavy traffic hours on public roads/Highways;
- Rig move plan shall be reviewed by Contractor senior management and XYZ Company Man prior to rig move. In case of using highways for rig move, XYZ Operation TL shall be informed;
- Rig Contractor shall conduct a risk assessment and take all necessary safety precautions and control measures during the rig move;
- Legal load requirement (Size, weight, height, length, etc.) while transporting the loads on the highway shall be followed;
- Necessary permissions (if any) from Government ministries shall be taken by rig Contractor prior to move;
- Crossing under the bridges and powerlines if any shall be done with caution;
- Route survey to be carried out by rig contractor to identify the overhead bridges, power lines and flyovers to ensure safe clearance upon loading on the trailers;
- The rig move convoy shall move with extreme caution during rig move on highways and public roads, considering the prevailing road, traffic and weather conditions.

6. RIGGING & DRILLING/WORKOVER OPERATIONS SAFETY

6.1. RIG INSPECTION BY COMPETENT AGENCY

Prior to the acceptance, the rig shall be subjected to a thorough inspection on various aspects such as design, construction, equipment integrity and certification etc. as per API Specification and industry/international practices. All OEM inspection certificates and documents shall be maintained at the rig site.

The team/Personnel for rig inspection may be constituted by Team Leader-Engineering or Team Leader of concerned operations team as appropriate for the concerned group.

Ideally, the above inspection shall be carried out by a third party competent agency to ensure the rig and its critical components, systems etc., are fit for purpose.

The rig shall be subjected to pre-spud inspection at every drilling/workover location as per **Annexure 13**, Pre-spud Checklist for Deep Drilling and Workover Rigs.

6.2. FALL PROTECTION

Personal working at height shall perform the job with all necessary fall prevention and protection measures. All the personnel involved in the rig move process shall be in compliance with the site PPE requirements. A full body safety harness shall be used when working within the substructure, in the mast, or any time a man is exposed to a fall of more than 1.8m/6ft (OSHA 1926.501)

All fixed stairs and ladders shall be provided with hand railings. All landings, stairs, ladders etc., shall be properly secured by appropriate fasteners (bolt, pins, studs etc.,) to the rigid structure. Hook or other types of ladders shall be positively secured to prevent the ladder from being accidentally displaced.

When rigging up/down, the permanent handrails on the rig floor and mud tanks shall be put in place/left in place. When it becomes necessary to remove hand rails, extra care

shall be taken around the opening. Suitable temporary physical barrier to be installed preferably including a man in a position to warn about the hazards.

Man riding winches shall only be used for a man riding operations strictly under work permit with proper supervision. Certified Man lift/material basket shall be used for all man lifting operations.

6.3. RIGGING UP AND RIGGING DOWN THE DERRICK/MAST

Operations such as lowering and raising of mast, substructure and draw works, shall be carried out under the supervision of Rig Superintendent or his designee and XYZ Rig Supervisor during day light hours only. During emergencies, if such operations are to be carried out in darkness, a necessary permission and approval (electronic mail/memo/note/SMS) shall be obtained from Drilling Operations Team TL. Adequate illumination to be ensured during the activity.

Ensure that the OEM procedure/recommendation, API RP 54 & API RP 4G applicable requirements are documented for rigging up/down the mast, substructure and draw works.

Before a mast is raised or lowered, the Toolpusher or his designee shall make a complete visual inspection of all its parts. Inspection of mast, sub-structure and their accessories to be carried out as per API RP 4G (Category 1 – daily visual inspection during operations; Category 2 – visual inspection during rig up).

For any structural defects noticed during such inspections, the same shall be repaired or the part to be replaced as per OEM recommendations and API RP 4G. Travelling blocks, Crown blocks and mast pulleys shall be inspected, cleaned, greased and maintained as per schedule. During rig up and rig down operations the rig shall be equipped with a necessary ladder/platform for workers to use in gaining access to workplaces at height and for performing jobs safely.

XYZ rig supervisor must be present during the rigging up/down of mast/substructure at well position for ensuring well/Christmas tree/well head safety. After rig up, XYZ rig supervisor to ensure that the rig centred with respect to the well.

Only trained and experienced crew in lowering and rising the mast shall be allowed to participate in the operations. A close supervision is to be ensured along with good communication between the crew for conducting safe mast rising and lowering operations. All necessary pre-checks including the effectiveness of breaking mechanism shall be made by the concern prior to raising the mast.

Except for the operator of the controls, no personnel shall be required or permitted to be nearby or beneath a mast and substructure during raising or lowering operations.

No loose tools, equipment, or materials shall be kept in a mast while it is being raised, lowered, or operated.

Every portable telescoping hydraulic lift mast shall be equipped with a safety mechanism designed by OEM to engage automatically if the lifting mechanism fails to prevent the mast from falling at an unsafe rate of speed. The safety device will be either inbuilt during the design and manufacturing stage itself or incorporated as an addition (if not available for existing rigs) if possible as per the modifications recommended by OEM and installed either as per recommendations of OEM of the mast by authorised, trained and experienced rig contractor personnel or under the supervision of the OEM with a communication to Controlling Team.

Provisions shall be made to prevent the mast from overturning or collapsing as a result of wind velocity. This shall be accomplished by the use of guy lines, (trailer mounted mobile rigs), ensuring the mast foundations/ support pads in such a manner as to resist overturning (within the specifications of the manufacturer), or by a combination of both guying and foundation as per API 4G.

Inspection, maintenance, testing and repair of mast, substructure, auxiliary brakes and draw works assembly (including all operating system) used for safe raising/lowering of

mast, substructure and draw works are to be carried out as per OEM and API requirements. In case of any conflict in the inspection requirements, the superintendent of the contract will decide the requirements and report to XYZ Rig Supervisor and XYZ HSE Supervisor.

The rig up and rig down activities will be carried out upon completing a rig specific pre-task check list developed by the Rig Contractor which includes:

- Inspection of the air compressor;
- Draw works & its controls functions;
- Auxiliary and emergency brake functional checks;
- Mast and substructure/bridle (bull) line/brake cooling system & strainers;
- Rig up and rig down control panel;
- Hydraulic systems and hoses;
- Audio and visual alarms;
- brake cooling pump;
- All other OEM requirements.

Corrosion inhibitors to be added in to the brake cooling system frequently as per OEM recommendations.

Rig specific JSA shall be developed based on the Contractor safe operation procedure (SOP) for rig up & Rig down operations. During the pre-job safety meeting, the JSA shall be discussed including roles and responsibilities of the crew.

Prior to lowering the mast check the Horse/Pillow for proper position and alignment with the required distance from substructure as accurate as possible so as to ensure the prevention of stoppage of rig up / rig down in between. The distance to be mentioned in Rig Specific Procedure and JSA.

The control panel for rig up & rig down activities shall be located for a clear visibility of rig up/ rig down operations. All the controls in the control panel shall be displayed permanently and visible.

6.4. SAFETY IN HYDROGEN SULPHIDE (H₂S) & GAS

6.4.1. H₂S DETECTION/MONITORING

An adequate number of Personal multi-gas detectors (with valid calibration certificate) for use by the personnel shall be made available. Spare monitors/detectors shall be maintained to replace the defective ones immediately.

Fixed monitoring systems with a beacon (separate light for each type of gas - AMBER for H₂S and BLUE or RED for LEL) and buzzers shall be provided at the rig. In addition to the fire alarm, it is recommended to provide an audible H₂S alarm in each cabin.

Visual low-level alarms shall be set for all fixed H₂S monitors to activate at 10ppm². High-level alarms shall be set no higher than 15ppm. The high-level alarm shall activate an audible evacuation alarm. For single-set point monitors, the alarm shall be set at 10ppm. Alarms shall be audible for all people working on the Rig even during the high cross wind.

All non-essential personnel shall be evacuated, and walk to their designated muster point, at 10ppm internal emergency team continues with SCBA until the well is secured. All active PTW shall be withdrawn at the first alarm.

During critical operations (well testing, well control etc.,) additionally fixed detectors to be ensured as required.

Fixed Monitor sensors should be located at least at the following locations as a minimum as appropriate:

- Bell nipple;
- Cellar;
- Mud-return line /shale shaker;
- Rig floor;

² 1mg/l = 1ppm & 1ppm = 0.0001%

According to OSHA (2015), the explosive range for H₂S in air is 4.5% to 45.5%.

- Mud pit.

The calibration of the continuous monitoring equipment shall be carried out prior to spud and at regular intervals as recommended by OEM/Contract requirement whichever is more stringent and tests should be documented. The calibration shall be done by OEM or OEM authorized agency or by trained and certified personnel by the OEM or OEM authorized agency.

6.4.2. TRAINING IN H₂S

All personnel working in H₂S hazardous area must be provided with H₂S training prior to beginning the work assignment and annually thereafter. Efforts to be made to ensure personnel is undergoing H₂S training prior to deployment at the rig site.

All employers, whether XYZ, Contractor or subcontractor, shall be responsible for the training and instruction of their own employees.

The trainer shall be a certified H₂S instructor who has successfully completed a course in H₂S instructor training as per ANSI Z390.1 2006.

Medics/Paramedics shall have a thorough understanding of H₂S intoxication, execution of antidotes and necessary symptomatic treatment.

6.4.3. GAS MONITORING

Associated gas or natural gas contains methane in larger percentage. The explosive limits of methane gas are considered as same for natural gas viz. 5% – 15% by volume in air. (Lower explosive limit is 5% and Upper explosive limit is 15%). Combustible Gas Detectors or Explosive Gas Monitors (or LEL monitors) measure the percentage of LEL present in the work area.

The gas monitors may also be the dual gas type which monitors H₂S and LEL.

Fixed monitoring systems shall be of the beacon (light colour: RED) & buzzer type. All hot works jobs done with PTW shall be stopped and Permits withdrew at locations where LEL is present. All non-essential personnel shall be evacuated at the first alarm.

Personnel working/visiting places where the gases are likely to be present, rig floor, shale shaker, mud system etc., shall carry portable gas detectors.

Gas detectors and personal multi gas detectors shall be calibrated as per manufacturer's recommendations. Adequate no of sensors shall be maintained for replacement.

Personnel shall be trained in the use of the detectors.

6.5. BOP – BLOWOUT PREVENTION EQUIPMENT

Blowout prevention equipment for drilling operations that is consistent with the requirements of the drilling program and the expected formation conditions shall be installed and maintained as per the drilling operation & workover program.

All pipe fittings, valves, well casing, casing head, drill pipe etc. exposed to well pressure shall have a working pressure rating greater than the maximum anticipated well pressure. The BOP stack and raiser connections shall not be short bolted (not less than 3 threads showing).

The frequency of Pressure tests on the well control equipment should be as per the drilling & workover program and or as per API RP 53 whichever is stringent/minimum.

Refer Table 1 & 2 of API RP 53: Recommended practices for BOP Equipment Systems for Drilling Wells, for recommended pressure test practices.

BOP in service shall be inspected daily and a preventer actuation test shall be conducted on each round trip, not more than once per 24 hrs period. Information on actuation test shall be mentioned in the daily drilling report. Annular BOPs shall be tested as per manufacturer's recommendations.

Remote controlling of BOPs shall be installed as an operational back up for the primary controls.

During installation, necessary control measures (JSA, PTW, Safety Meeting etc.) shall be implemented to prevent injuries due to swinging or dropping of the BOP. All non-essential personnel shall stay clear during the BOP rig up/down activities.

BOP shall be secured with diagonal braces with substructure.

BOP equipment shall never be heated or welded on by rig personnel.

BOP drills shall be conducted at least once in a week and results of drills shall be reported through Daily Drilling Reports. (Please refer **Annexure 14** Emergency Drill Matrix).

The choke and kill lines shall be flushed each time after the use to prevent plugging. During cold weather conditions, choke and kill lines should be flushed to prevent freezing. These lines shall be anchored/tied to prevent whipping due to a pressure surge.

BOPs shall be recertified at regular periods as per OEM, API requirements, Contract document or as mentioned in the certificate issued by the certification agency, whichever is minimum.

Functioning of emergency battery back-up for BOP control units to be checked, if available along with the BOP pressure test.

The accumulator shall be located at least 30m (or 100ft) from the well bore for exploratory wells and 20m (or 60ft) from the wellbore for development oil wells.

There shall be at least two sets of remote controls for accumulator operation in addition to the master control of the main unit - one of them shall be located on the rig floor (accessible to the driller) and the other shall be in close proximity to the Toolpusher office.

All operating controls on the BOP control and on the remote-control panels shall be clearly and permanently marked.

Accumulator controls shall be in either the open or closed position, not in the neutral position. The access to the BOP controls shall be obstruction free. Hydraulic lines from the BOP to control unit shall be either steel pipe or API approved armoured hoses.

Suitable fall protection shall be utilized when working at height to ensure 100% during rigging up/down BOP activities. Shear blind ram control shall be guarded to avoid accidental operation.

All required safety valves (ball type/FOSV) and inside BOP's (check valve type) with tool joint and the largest available bore plus any necessary subs to fit drill collars, drill pipe, or tubing in use, shall be kept on the rig floor at all times.

All safety valves, inside BOP, and subs, as well as closing wrenches and setting tools, shall be stored (valves open) in a visible and permanent location.

An additional small size safety valve and inside BOP shall be required with a tapered drill string. The safety valve shall always be installed first, properly torqued and closed before installing the inside BOP.

Pressure/Function test on BOP stacks shall not be carried out on the rig site.

6.6. DRAW-WORKS

Draw works should be equipped with a safety limit switch (Crown-O-matic) that prevents the travelling block from striking the crown block. The switch shall be functionally checked before each trip and after each drill-line slipping/cutting operation.

Crown/floor saver (anti-collision device) may also be fitted apart from crown-o-matic and need to be tested after every slip and cut jobs, maintenance and calibrations.

The draw works guard shall remain in place in good condition. Draw works machinery shall not be lubricated while in operation.

Emergency Shutdown switches for draw works powers shall be installed at the drillers control console.

The draw works shall be visually inspected every day. The coiling system shall be monitored closely. Minimum 14 wraps of drill line shall be on the drum at any time.

Braking system shall be inspected and maintained as per manufacturer's recommendations. A double braking system (Auxiliary Brake) with rated capacity should be installed on the draw works. The electric auxiliary brakes must be fitted with a power fail safe system.

6.7. CATHEADS AND LINES

Personnel operating cathead or lines powered by cathead shall receive instructions for safe use of this equipment.

Lines powered by cathead should be of proper length and maintained in safe working condition.

A guard shall be provided for protection of the personnel at the draw works control when the line is in close proximity to the operator during operation of lines powered by the cathead.

Catheads shall be checked for grooves and rebuilt and turned when necessary to prevent fouling. Cathead groove depth should not exceed $\frac{1}{4}$ inch.

Precautions shall be taken to prevent entanglement of other lines with a line in use on the cathead. No chain is allowed to be used as cathead lines.

No rope splice shall be allowed to contact the cathead friction surface.

Appropriate lifting tools such as elevators or lifting caps shall be utilized for lifting tubular. The wire rope/web sling shall be wrapped appropriately (Preferably two wraps) around the tubular in order to prevent it from slipping out while lifting with travelling block, air hoist, etc.

6.8. WIRE ROPES, SLINGS AND TOOLS

All wire ropes shall be pre-use checked visually every day.

Register of lifting gear and tackles used at the site shall be maintained. A six-monthly inspection to be carried out for lifting gears and tackles by third party inspector and inspection records to be documented.

The wire slings shall be mechanically spliced.

All wire rope and slings should be as per API 6A. The new slings and lifting tackles should have test certificate from 3rd party testing/certification agency.

A standard criterion based on a number of broken strands, corrosion, kinks, marked erosion at the ends, wear and tear, crushing, cutting, bird caging etc shall be established for rejection and disposal of wire ropes. The rejected ropes shall not be reused by manual splicing & shall be disposed of by cutting into pieces.

When the wire rope is wrapped around the drum, there shall be at least 3 wraps remaining on the drum to prevent strain on the fastening devices or as per winch manufacture recommendation.

Deadline anchors for hoisting lines should be used, installed and maintained as per OEM.

Four parts shackle (with lock pin) to be provided on all permanent structure. All slings and tools shall have an identification number and safe working load embossed on the tag. A procedure for colour coding of wire ropes and slings shall be followed as per contractual clause.

Any wire rope or sling that is repaired or modified shall be subjected to load test to check and alter the load rating.

The hoisting hook shall be equipped with a safety latch to prevent accidental release of the sling from the hook.

Travelling blocks shall not be operated unless guards in place. Crown block assemblies shall be secured to prevent sheaves from jumping out of bearings.

Latches, locks, pins etc shall be inspected periodically by the rig crew for wear and tear. Worn out parts shall be replaced.

6.9. DRILLING FLUID TANKS

Pits, tanks used to store and circulate flammable fluids (i.e. mud diesel) should be located at least 30m (100ft) from the well.

Personal entry into tanks shall be controlled by Confined Space Entry Procedure and applicable Permit Work Procedure. Contractor shall present their procedures together with the mandatory HSE plan.

Electric motors and light fittings shall conform to the area/zone classification requirements.

All rotating parts shall be guarded suitably. Appropriate safety signage shall be displayed. An adequate number of emergency eye-wash/emergency shower stations shall be provided with thermal isolation such as shading, thermo-cool covers etc.

All floor openings shall be covered and proper standard railings shall be placed.

Proper PPE shall be used and extra PPE storing box to be available at the pit area for emergency situations.

The mud tank passages and walkways shall be made of gratings.

When the drilling operations are completed and the rig is moved from the location, the left-over mud shall be disposed of as per State of KEPA Regulations.

Pit level indicators shall be installed and maintained. Caustic mixing tanks shall be used under supervision and PTW.

Rescue tripod with winch shall be used while cleaning/doing any maintenance work on the mud pits with tanks that have covered top section with plates as the effectiveness of the ventilation is limited in those type of tanks.

Necessary shading over the mud pit area to protect personnel from ambient heat shall be provided.

6.10. HANDLING OF PIPES

Incorrect stacking of tubular and sack materials is the cause of many accidents on site. Casing rack loading shall be carefully considered to avoid subsidence and hence instability. Adequate strength dunnage and nailed-in chocks at the end of each row of pipe rack shall be provided. Pipe rack shall be placed on the levelled ground.

Movement of personnel shall be restricted between pipe rack and truck/trailer during loading, unloading or transfer operations. Non-essential personnel shall not be in close proximity to a load during loading and or the removal of securement, or during the unloading/offloading.

Provision should be made to prevent pipe/casing from rolling off pipe racks or trucks. During loading of pipes on rack/trailer, bolster" supports shall be placed and anchored to support the load. On the trailer, the pipes/casing shall be secured with load straps or chain & ratchet binders of adequate strength to prevent a roll-over.

For stacking on the ground, the maximum stacking height shall not exceed 1.5m (5 ft) from ground level. For loading of trailers, the maximum load capacity of the trailer shall not be exceeded.

Thread protectors shall not be dropped from rig floor or rolled down to the catwalk.

6.11. MAN-RIDING WINCHES

Winches used exclusively to move personnel to inaccessible places shall be equipped with an automatic fail-safe brake and have non-rotating wire rope in good condition installed. The winch shall not be used for material movement/transportation.

Testing and Certification of the winch for man-riding is essential. The safe working load shall be marked & shall not be exceeded.

Any other operation which may interfere with the movement of winch shall be discontinued until the operation is completed.

The winch shall be under the control of a fully competent member of the crew instructed on the correct procedures to be followed and the safety precautions to be observed.

The speed limit control switch to have controlled the movement of the winch shall be installed and in working condition.

When using a chair, a safety belt shall be worn and attached to the winch wire at a level independent of the chair.

A bosun's chair (boat-swain/full body harness) or equivalent, attached to the man rider winch line, shall be used while performing man riding operation.

TDS rotation shall be stopped if using man rider winch on the rig floor. Man riding operation at substructure, shall not be allowed using rig floor man riding winch. Man riding operation shall never be done when the person riding the winch is out of sight from the operator. Winch shall be never unattended while in operation.

Hydraulic or air winch lines with proper rating capacity are permissible as a personnel lift device if they meet the following:

- Self-centring, that when released returns to the centre neutral position and has locking/braking capability;
- Control lever shall be attended at all times while lifting, stabilizing or lowering of personnel;
- Lifting cable shall be a minimum of 3/8-in. diameter and all hoisting equipment shall have a minimum workload of 1800Kg;
- All connections shall meet ANSI standards;

- Man riding winch to be inspected, tested & maintained as per OEM Manual.
- Man-rider winch to have a permanent sign which states 'Man riding only'.
Man-rider winch to have a guard, safety shut off valve at the inlet, wire rope spooler and drum to have min. 4 wraps at all times.
- Man-riding to be carried out as a last option and to be done with Contractor PTW procedures;
- OEM recommended man riding winch emergency lowering procedure shall be displayed on the rig floor.

6.12. MOUSE HOLE

Unless the mouse hole extends at least 30cm (12inch) above the rig floor, the opening in the floor above the pipe shall be covered when a joint of pipe is not in the hole.

If it is extended as said above, it shall be painted with black and yellow stripes to communicate tripping hazard to rig crew.

Extreme care shall be taken and proper/adequate slings/lifting methods shall be followed while removing mouse hole pipe at the time of rigging up/down.

Mouse hole pipe at the substructure shall not be used as an anchoring point.

Tubular shall be kept in mouse hole gently and not released or dropped from height.

6.13. CATWALK

Catwalks shall be provided with a stairway at the outer end.

The catwalk shall be level and free from tripping hazards with a stairway to the ground at each end.

Adequate stoppers shall be welded at the catwalk to prevent falling of drill pipes and other related drilling tools.

Hydraulic operated shall be installed only over a concrete base and never directly in the ground.

6.14. PREVENTIVE MAINTENANCE AND INSPECTION OF CRITICAL EQUIPMENT

The safety critical Equipment shall be subjected to inspection and maintenance as per API requirements, contract requirements and OEM recommendations.

All equipment such as pressure vessels, structural, lifting equipment, wire ropes, slings, PSV, Compressors, engines, Rig Instrumentation, Pressure Gauges shall be listed and subjected to inspection and preventive maintenance as scheduled in contract specifications and manufacturer's recommendation. All modifications, repairs or alterations to load bearing elements of equipment shall be inspected by XYZ approved competent third party and certified prior to commissioning for operation.

Operation and maintenance manual shall be provided for all rig equipment including equipment supplied by vendors, Sub Contractors, and service Contractor. The manual shall include a reference and the equipment tag number/Serial Number to be available at the site. Preventive Maintenance/Inspections shall be carried out as per OEM or API requirements.

Spares and spare parts with sufficient number shall be available at rig store for ready access. Shelf life items list to be made available for all critical rubber items.

6.15. ELECTRICAL SYSTEMS, EQUIPMENT AND FITTINGS

Generators shall be located at least 30m (100ft) from the well head preferably on upwind direction. Exemption to this requirement can be given by the Group Manager when the terrain, location or rig configuration condition do not permit to maintain this safe distance, by conducting a risk assessment specific to the location and by implementing the mitigation measures to ALARP levels. Refer to API 54.

Spark arrestors shall be provided to the exhausts of engines located within 30m (100ft) from the well bore.

Generators shall have an automatic overload tripping facility to prevent the equipment from overheating resulting into fire.

Proper illumination shall be provided on the rig site. Refer to Appendix 7: Working environment lighting and Minimum Light levels allowed for occupational activities of KEPA.

All the light fittings, junction boxes, cables, electric motors, equipment and other electrical fittings shall be of standard make and conform to the zone classification requirements.

Hazardous Zone classification drawing as API standard shall be available at the site.

Rig cables shall be installed so as to protect it from abrasion, vehicular/personnel movement, cuts and damage from other sources. When electric cable insulation is cut, it shall be replaced. No naked jointing is permitted.

The authorized rig electrician shall check for the above requirements when the rig is in operation and during the transit.

All the power cables shall be provided with cable markers for easy identification.

Electrical light fixtures on mast and substructure to be provided with safety falling nets.

Rig power emergency shut-down system shall be function tested on a quarterly basis OR as per OEM requirements and results of the function tests to be documented at the rig site.

6.16. DRILL STEM TESTING (DST)

During DST, no engine shall be operated within 30m (100ft) without a spark arrestor fitted to its exhaust.

Drilling fluid density and viscosity shall be checked and maintained.

Fluid volume in the casing should be monitored while going in and coming out of the hole to assure that the well remains under hydrostatic control. DST to be conducted in day light.

The mud bucket should be hooked up and ready for use before the drill stem test tool is pulled out of the hole. Return from mud basket to be connected to the trip tank.

Test tools should be initially opened only during day light hours.

The fluid level in the annulus should be checked regularly throughout the test to ensure the packer is holding and gas is not leaking into the annulus from the test string.

6.17. FIRE PREVENTION AND PROTECTION

Spark arrestors must be provided on all engine exhausts located within 30m (100ft) of the wellbore. Open fires, transformers, or other sources of ignition shall be permitted only in designated areas located at a safe distance from the well head or flammable liquid storage areas.

Only approved heaters for Class I Zone 2 areas, as designated by API RP 500B, shall be permitted on or near the rig floor. The safety features of these heaters shall not be altered.

Fire equipment layout needs to be posted at all conspicuous locations of the rig.

The material used for cleaning shall have a flash point of not less than 38°C (100°F). For limited special purposes, a lower flashpoint cleaner may be used when it is specifically required and should be executed by applicable procedures.

Areas around well shall not be used for storing flammable liquids.

Firefighting equipment shall not be tampered with and shall not be removed for other than fire protection and firefighting purposes and services. Hot work stand-by firefighting equipment shall be made available separately.

A main fire water pump, as well as standby (diesel engine/electrical driven) with required rating, shall be made available at the rig site as per contract, with associated equipment such as manifolds, fire hoses and connecting piping with appropriate rating to cover the rig site area adequately. Fire water pump shall be function tested periodically and water pressure shall be recorded.

Skid mounted fire water tank mounted with foam tank shall be made available with the required capacity as applicable.

Adequate water resource shall be made available for firefighting purposes.

An adequate number of trolley type DCP fire extinguisher of minimum 63 kg capacity (preferably Monnex powder type) and 12 kg of portable type shall be kept in strategic locations and according to rig fire plan.

All new Fire extinguishers initially shall be inspected by XYZ Fire station and subsequently shall be routinely inspected on monthly basis by a competent person.

It is recommended to have an annual inspection of fire extinguishers by nearby XYZ fire station.

Extinguishers shall be provided with an inspection tag to indicate the updated status of inspection.

A fire watch and fire-fighting equipment shall be readily available near all hot works. When welding, cutting or other hot work is performed in locations where other than a minor fire might develop, a person shall be trained and designated as a fire watch. The area surrounding the work shall be inspected after the hot work is completed for minimum 30 min.

A foam tank for spray system consisting of a piping system at the top mud tanks fitted with sufficient spray nozzles to cover the complete tank surface area in case of fire, in drilling and workover rigs (Pulling unit & heavy oil drilling rigs are exempted) shall be provided.

BOP foam spray system consisting of steel piping mounted above the BOPs and fitted with spray nozzles.

Personnel shall be familiarized with the location of fire extinguishers, hose reels, and fire pumps operation and in the operation of such equipment. Fire drills shall be carried out by the crew at frequent intervals.

6.18. HANDLING AND STORAGE OF GAS CYLINDERS

An ignition source, smoking or open flames shall be at least 6m (20ft) away from flammable or toxic compressed gasses storage area.

All gas cylinders shall be fitted with cylinder caps at all times except during usage.

Compressed gas cylinders shall be transported, stored and used in an upright position and secured tightly in proper storage racks.

Dented, bulged or cylinders with excessive corrosion shall be removed from service.

Cylinders shall be stored in a cool, shaded area and away from flammable and corrosive liquids.

Oxygen cylinders in storage shall be separated from flammable gas cylinders or combustible material.

The use of Flashback arresters at both the ends (Cylinder as well as cutting torch) shall be mandated. Maximum operating pressure for acetylene cylinder shall not exceed 10 KPa (15 psi)

Empty cylinders are identified and stored separately in racks from full cylinders.

Applicable Colour coding of the cylinders shall be done and colour code chart shall be displayed at the welding shop.

6.19. CHEMICAL STORAGE AND SAFETY DATA SHEET (SDS)

All chemicals shall be stored in segregation, reactive chemicals shall not be stored together. All containers or the place where chemical stored shall be indicated by relevant hazardous signage.

Safety Data Sheet (SDS) shall be displayed at the site where the chemicals are stored or in use. A copy of SDS shall be kept with rig medic, company man, Toolpusher, and Safety Officer.

Empty containers, particularly those which contained flammable substances, shall be treated as hazardous waste and disposed of the site as soon as possible in accordance with XYZ Waste Management Procedure. Chemical spillages shall be cleaned and the waste shall be treated as hazardous waste. The empty (oil/chemical) containers shall not be cut and/or reused.

No hot works, naked flames or spark generation works carried out near the storage place. Hot work permit shall be obtained if any work has to be performed.

An adequate number of fire extinguishers shall be provided near the storage place.

PPE such as aprons, face shield, PVC/rubber hand gloves, rubber boots with steel toe, as per SDS shall be worn while handling chemicals. A separate PPE storage shall be maintained at the mud tank area.

Adequate Emergency eye wash and emergency shower stations shall be installed and maintained in an accessible location. The eye wash & emergency shower shall be connected to a fresh water source.

All the concerned personnel shall be trained in chemical handling, hazardous characteristics of the chemicals, emergency & first aid procedures.

6.20. MANAGEMENT OF CHANGE

The effective control of change may be of personnel, technology or procedure, is key to assuring the ongoing integrity of the operation. All changes shall be risk assessed to ensure that they do not inadvertently introduce other risks. Changes and their consequences shall be discussed and approved.

6.21. HANDLING EQUIPMENT CONTAINING RADIOACTIVE SOURCE (LOGGING)

Radioactive logging sources shall be housed in dedicated carrying shields. Carrying shields shall be clearly marked with the Transport Index (TI) number.

Upon arrival of radioactive source materials at the rig site, they shall be immediately transferred from the transport container to the logging Contractor's source store. This task shall only to be done by specifically authorized personnel for ex., Logging Engineer on site. Necessary PTW shall be obtained prior to operations.

In the absence of such authorized personnel, the transport container shall be placed in a segregated area away from personnel and barricade at distance around the container as determined by the TI marked on the container.

Areas with excessive radiation levels shall be barricaded to restrict personnel entry.

A register of radioactive sources shall be kept on the rig by the Logging Engineer with details of all sources at site, transport record and destination of dispatched sources with dates.

Logging Engineer is responsible for the supervision of all work involving ionizing radiation.

Ensure that the personnel working near the source shall wear both gamma and neutron valid personal dosimeters.

Carrying shields are only to be removed from the designated store area under the direct supervision of the Logging Engineer and transported in a shortest possible route which is away from the rig personnel.

Trefoil signage shall be displayed at the working place.

Before handling the radioactive source, Logging Engineer shall ensure that all possible open floor areas are covered. Access points are to be chained off to establish a controlled area. Driller's dog-house is exempted from the controlled area for maintaining full surveillance on the well. However, during handling of the source by Logging Engineer, the Driller and rig floor crew should keep clear of the source (distance as advised by Logging Engineer).

Logging Engineer is the only authorized person to remove sources from their carrying shields. Directional sources shall be pointed away from the personnel on the rig. The transfer of source from carrying shield to logging tool and vice versa shall be completed in the shortest possible time.

While attempting to fish a tool containing radioactive source, it is important to monitor the mud returns to detect any possible increase in radioactivity.

Necessary permissions and approvals shall be obtained by Service Contractor from Radiation Protection Department under Ministry of Public Health, which monitors radioactive standards in Kuwait, for transporting/deporting the radioactive sources. Radioactive Protection Safety Officer (RPSO) shall be consulted for all matters related to radiation, radioactive material handling, movement, usage, approvals etc.

6.22. WELL TESTING BY SERVICE CONTRACTOR AT RIG SITE

All equipment used in the well testing shall be fully pressure tested and checked. Follow hazardous zone classification requirements. Well testing operation shall be conducted through PTW system.

After perforation, the opening of the well to off-load tubing contents shall be carried out only during day light. Thereafter, the production test may continue during hours of darkness.

Well fluids having oil shall be diverted to GC to minimize oil accumulation at the pit. Effective coordination between GC and rig is essential. Risks of Simultaneous Operations between GC and rig shall be discussed, documented and precautions implemented.

Prior to the well testing, a pre-job meeting shall be conducted, fire/H₂S drills shall be conducted.

Verify well head and ESD system function correctly.

Power shutdown of all rig equipment during flow testing operations to be ensured.

Lifting operations shall not be allowed near wire line operation, flow lines, separators, and choke manifold.

A close check of casing/tubing annulus pressure shall be maintained. Bleed-off if pressure increases.

Multi-gas detectors that sense for H₂S/O₂/LEL (Combustible gas), a cascade breathing air system, required number of 30 minutes Breathing Apparatus, breathing air compressor, atmosphere sampling units for H₂S and SO₂ shall be made available prior to the well testing. The crew shall be thoroughly trained in H₂S and SO₂ hazards.

When additional resources are required, a third party competent agency should be assigned to support the operations including monitoring the H₂S levels in and around rig operations.

6.23. FLARING

Flaring is a safe option relative to cold venting during well testing or other operations due to associated toxic and flammable properties. Flaring of gasses, however, releases its combustion products along with unburnt gases which are classified as greenhouse

gasses and pollute the atmosphere. It is essential and highly recommended to use the technologies that provide:

- No flaring (well testing without flaring);
- Green flaring (using specially designed flares that ensures complete flaring of gasses);
- Using H₂S scrubbers to reduce H₂S concentrations in the atmosphere during flaring operations.

Inform Emergency Response Centre (115) prior to starting of flaring operation. The nearby GC, rig or any other operation in the vicinity of location (simultaneous operation), which is likely to be impacted due to flaring operation, shall be intimated on the nature of testing and probable duration. **Annexure 15**, Notification on Flaring from Drilling Operations, shall be filled up and forwarded to those as mentioned, prior to the flaring operation (Preferably before 48 hours). While flaring outside the fence, local relations and HSE Group shall be notified by HSE (D&T) Team.

Flare pits are recommended to be made impervious by suitable Fire proof lining material to prevent percolation of fluids into the ground.

Classify the hazardous zone around the operation and barricade with adequate notices to prevent entry of non-essential personnel and any other activities. Roadways leading to the flare area shall be barricaded and detoured to restrict entry to unauthorized personnel/vehicular movement.

Periodic H₂S and LEL monitoring around the site where the flaring operation is performed shall be conducted and levels shall be recorded.

High winds/gales may extinguish the flame resulting into release of toxic, flammable and greenhouse gasses into the atmosphere at high concentrations. Continuous monitoring shall be ensured. Oil spill equipment is recommended.

Extinguished flare conditions may also lead to gas cloud formation under dispersion condition and may lead to vapour cloud explosion. Continuous monitoring of flaring is mandatory.

Personnel working in high noise area shall wear appropriate ear protection.

Flaring is recommended to initiate only during day light. An adequate number of SCBA sets and cascade system shall be kept ready to use.

Flare lines shall not have any sharp bends and with minimum elbow bends. The flare line and the stack shall be anchored firmly and properly.

No personnel shall enter a flare pit to ignite the flare. The remote ignition device is recommended. Lighting a flare shall be done from upwind side.

When there is no wind or when the wind direction is uncertain, no attempt shall be made to start the flaring operations unless the person can locate himself in a position known to be free of flammable concentrations of gases or vapours.

A flaring meeting has to be conducted prior to the commencement of the operation at the rig site led by the XYZ Drilling Supervisor, XYZ HSE Supervisor, Service Company Representatives, Toolpusher, Safety officer and other relevant personnel. Job Safety Analysis shall be conducted and precautions shall be informed to all through pre-job and pre-tour safety meetings.

6.24. DROPPED OBJECTS PREVENTION PROGRAM (DROPS)

Mast and Substructure shall be inspected for potential dropped objects by the crew at a minimum of once per month with inspection results recorded with the name of the inspectors and verified by drilling Contractor Senior Toolpusher.

Inspection zones are generally identified as below:

- Travelling Equipment;
- Crown Section;

- Monkey board to Crown;
- Rig Floor to Monkey Board;
- Substructure Area.

A log sheet shall always be used to effectively control temporary equipment within the mast, i.e., hand tools used during maintenance, logging tools, wire line operations or equipment taken up the derrick for operations such as wire line work.

Dropped objects training shall be given to crew for effective implementation of the dropped object prevention program.

The drop object identification shall be carried out prior conducting critical activities on the rig. Permanent fixture which requires shackles needs to be of Four Parts (Bow, Bolt, Nut and retaining pin) as a part of effective Dropped Object Prevention Program. Screw pin shackle shall be used only for the temporary usage.

Secondary retention line shall be provided for all additional objects in the mast and substructure such as inertia reel, sheaves, pulleys, electrical fittings, bumper blocks etc.

6.25. WELLHEAD SAFETY

Well head to be visually inspected by XYZ Rig supervisor before installing to the well.

All C&D Sections and sections above (Hitch sections and beyond) on all deep wells (Jurassic & Exploratory) should have two valves installed on either side with one VR plug on one side and a blind gauge on the other side.

All new sections C&D well heads to have double valves installed on each outlet as mentioned above.

PTW shall be signed by either XYZ rig Supervisor or Toolpusher before any job related to opening and closing valves on well head sections. All permits shall be kept with the Toolpusher and copied to XYZ rig supervisor for a reference.

Any work on opening and closing well head valves to be supervised directly by the XYZ rig supervisor or the Toolpusher.

6.26. PERFORATION

All sources of ignition such as operating of engines, motors, hot works etc which are not essential to the operation shall be shut off until the explosive device has been lowered into the well depth of 60m (200ft) or more.

Radio silence and radar frequency units shut off shall be observed within hazardous distances of explosive operations. Refer IME Safety Publication No 20 for recommended safe distances.

During radio silence, radio transmitters are shut off and radio beacons are turned off. Portable radios shall be collected from all the personnel (check the inventory) and kept with the designated person. Road signage shall be placed at a minimum distance of 150m (460ft) from the location to prevent access of vehicles fitted with transmitting equipment.

Signals between the supervisor, perforating personnel and others shall be agreed prior to initiation of operations. All non-essential personnel shall stay away while assembling, picking up and lowering the gun.

Electrical grounding between the well head, service unit, and rig structure shall be made prior to operating tools using explosives with electric blasting caps.

Assemble guns in a suitable area, such as on the catwalk or end of the pipe rack. Post restricted area signage and ensure free from potential activation sources such as electrical devices, stray currents etc.

Perforating operations using electric blasting caps shall be suspended or loaded guns safely isolated during sand storms or when lightning is in close proximity to perforation activities. Circuit alterations shall not be done while perforating gun is attached to the cable head.

Blasting caps and boosters shall be transported in approved cap boxes. Cap leg wires should remain shunted until the time the cap is wired into the circuit.

When checking and/or arming an electrical blasting cap, it shall be enclosed in a safety tube.

Upon completion, of perforating operations, all explosive materials and scraps should be removed from the site.

7. WELL SUSPENSION OR ABANDONMENT

7.1. ABANDONMENT

Well abandonment means to cease efforts to produce reservoir fluid from a drilled well and to plug the well without adversely affecting the environment.

Wells and sections of wells should be abandoned so as to isolate effectively all potential hydrocarbon and fresh water bearing formations from one another.

Records to be made available in the open wells and a diagram showing the abandonment status is also to be made showing clearly all relevant data.

After plugging and abandoning the well, at the surface, site restoration shall be completed so as to bring it to its near original condition.

Program for Abandonment of radioactive source in down hole during drilling and workover operations shall be developed by Drilling Groups as part of Drilling Operations Manuals and followed accordingly.

7.2. SUSPENSION

Rig and other associated material/equipment shall be moved out of the site. All hazardous, non-hazardous waste and sewage shall be cleaned up. Well head shall be fenced and marked by concerned Asset Team.

Asset shall be intimated of the suspension and again when the well is reopened for drilling. A decision on the site restoration shall be discussed and agreed with the Asset which is primarily based on the re-opening of the well for continuing the drilling.

Well and the site shall be under the control of the Drilling Group during suspension until a decision is made on the well program.

Notify all the concerned including the Asset, about the suspension. Notice boards shall be displayed.

8. REFERENCES

- ANSI 87.1 Standard Practice for Occupational and Educational Eye and Face Protection;
- ANSI Z358.1 Emergency eye wash and shower equipment;
- ANSI Z359.1 Safety requirements for personal fall arrest systems;
- ANSI Z41.1 Men's Safety Toe footwear;
- ANSI Z88.2 Respiratory Protection;
- ANSI Z89.1 Safety requirements for Industrial Head Protection;
- API RP 2003 Protection against Ignitions arising out of Static, Lightning and stray currents;
- API RP 2201 Procedure for welding or Hot Tapping on equipment in service;
- API RP 49 Safe Drilling of Wells containing Hydrogen Sulphide;
- API RP 500B "Recommended Practice for Classification Location for Electrical Installations at Hazardous Area/Zone";
- API RP 505 Classification of locations for Electrical Installations at Petroleum Facilities as Class I, zone 0,1 & 2;
- API RP 53 Blowout prevention equipment systems for drilling operations;
- API RP 54 Recommended Practice for Occupational Safety for Oil and Gas Well Drilling and Servicing Operations;
- API RP 55 Conducting Oil & Gas Producing and Gas Processing Plant Operations involving Hydrogen Sulphide;
- API RP 67 Oil field explosives safety;
- API RP 68 Well Servicing and workover operations involving Hydrogen Sulphide;
- API RP 500 Classification of locations for Electrical Installations at Petroleum Facilities as Class I, Division 1 & 2;
- Editors (2009). *IADC Drilling Manual* (11th ed). Houston, TX: Author;
- International Association of Geophysical Contractors (2012). *IAGC Geophysical Operations Safety Manual* (10th ed). Houston, TX: Author;
- IME SP 20 Safety guide for the prevention of radio frequency radiation hazards in use of commercial electrical detonators (blasting caps);

- KOC Development Drilling Manual;
- KOC Workover Completions Policies/Procedures Manual;
- KOC.EV.001 Environmental Aspects Identification and Assessment Procedure;
- KOC.GE.011 HSE Procedure for Exploration, Drilling and Workover;
- KOC.GE.016 KOC HSE Audit, Inspection, and Self-Assessment Procedure;
- KOC.GE.037 HSE Procedure for Rig Move Operations;
- KOC.GE.038 Procedure for HSE Planning of Well Delivery Projects;
- KOC.HE.003 Gas Testing Procedure;
- KOC.HE.018 Occupational Health Risk Assessment Procedure;
- KOC.SA.004 Permit to Work Procedure;
- KOC.SA.007 Entry into Confined Spaces;
- KOC.SA.010 Procedure for Personal Protective Equipment (PPE);
- KOC.SA.013 Mobile Equipment Procedure;
- KOC.SA.018 Safety Risk Assessment Procedure;
- KOC.SA.024 Job Safety Analysis (JSA);
- KOC.SA.025 Procedure for handling of explosive materials, substance and EOD;
- KOC.SA.026 Excavation Safety Procedure;
- KOC.SA.029 Safety Requirements for Lifting, Shifting and Material Handling;
- KOC.SA.034 Guidelines for Safety Hazard Identification;
- KOC.WD.PGS.PM.001 Well Delivery Project Gate System Manual;
- KOC-G-19 KOC standard for security system;
- OSHA 29 Ionizing Radiation CFR 1910.1096
- Ministry of Oil (1989). *Regulations for the Conservation of Petroleum Resources, Technical Affairs*. State of Kuwait: Author;
- Regulations implemented under Law No.21/1995 as amended by Law No.16/1996 Regarding Environmental Requirements & Standards in the State of Kuwait, Kuwait Environmental Public Authority

ANNEXURES

ANNEXURE 1 – DRILLING WELL LOCATION HANDOVER CHECKLIST - FROM PRODUCTION/GAS OPERATIONS/WATER WELLS HANDLING TEAM TO DRILLING OPERATION SUPPORT/TRANSPORT OPERATIONS SUPPORT TEAM PRIOR TO SITE/PIT PREPARATION

DATE		WELL N°	
PRODUCTION OP./GAS OP./WATER HANDLING TEAM			
FIELD DEVELOP/EXPLORATION TEAM		XYZ WELL SITE PREPARATION TEAM/GROUP	
XYZ WORK PERMIT N°		SITE/PIT PREPARATION CONTRACTOR	

ITEM DESCRIPTION	Yes	No	N/A	REMARKS
EOD CLEARANCE AVAILABLE FOR THE WELL LOCATION?				
XYZ WORK PERMIT ISSUED FOR THE JOB?				
ARE ANY TEMPORARY CAMPS/CATTLE HERDS SPOTTED NEAR THE LOCATION?				
ARE ANY TEMPORARY CAMPS/CATTLE HERDS IF AVAILABLE, ARE THEY LOCATED AT A SAFE DISTANCE AS PER PROCEDURE				
IF TEMPORARY CAMPS/CATTLE HERDS ARE PRESENT NEAR WELL LOCATION AND NOT MEETING SAFE DISTANCE CRITERIA, WAS THE XYZ LOCAL RELATIONS TEAM INFORMED FOR FURTHER ACTIONS?				
PRODUCTION OPERATIONS/GAS OPERATIONS/WATER HANDLING/OPERATIONS ASSETS/PROPERTY/OVERHEAD/UNDERGROUND POWER/UTILITY LINE/POWERLINE NEARBY EXISTING/FUTURE WELLS ARE AT A SAFE DISTANCE FROM THE WELL, FLARE PIT AND BURN OFF PIT AS PER REQUIREMENTS?				
FOR NON-COMPLIANCE OF SAFE DISTANCE REQUIREMENT, CONTROL MEASURES ARE REQUIRED TO BE IMPLEMENTED TO REDUCE RISK TO ALARP. (REFERENCES ON EVIDENCE PROVIDED)				

HANDING OVER – SIGNATURE

PRODUCTION OP./GAS OP./WATER HANDLING TEAM

NAME

DESIGNATION

XYZ ID -

TAKING OVER – SIGNATURE

DRILLING OP./TRANSP. OP. SUPPORT TEAM

NAME

DESIGNATION

XYZ ID -

ANNEXURE 2 - DRILLING WELL LOCATION HANDOVER CHECKLIST - FROM PRODUCTION/GAS OPERATIONS/WATER WELLS HANDLING TEAM TO DRILLING OPERATION SUPPORT/TRANSPORT OPERATIONS SUPPORT TEAM AFTER TO SITE/PIT PREPARATION

DATE		WELL N°	
PRODUCTION OP./GAS OP./WATER HANDLING TEAM			
FIELD DEVELOP/EXPLORATION TEAM		XYZ WELL SITE/RIG ROAD PREPARATION TEAM/GROUP	
XYZ WORK PERMIT N° (LAST ISSUED)			

ITEM DESCRIPTION	YES	NO	N/A	REMARKS
WELL LOCATION AS PER DESIGN/WELL SITE LAYOUT?				
APPROACH ROAD AND RIG ROAD AS PER DESIGN/WELL SITE LAYOUT?				
WATER PIT AND DRILLING WASTE PITS AS PER DESIGN/WELL SITE LAYOUT?				
FLARE PIT AND BURN OFF PIT AS PER DESIGN/WELL SITE LAYOUT?				
WATER PIT, WATER-BASE MUD AND OIL-BASED MUD PITS PREPARED AND LINED WITH PLASTIC LINER?				
WATER PIT, WATER-BASE MUD AND OIL-BASED MUD PITS PROVIDED WITH REMOVABLE FENCE (2M HEIGHT) ON THE FOUR SIDES?				
WELLHEAD/CELLAR PREPARED AND BARRICADED WITH PORTABLE CONCRETE BLOCKS (STANDARD JERSEY BARRIERS) AFTER INSTALLING CONDUCTOR PIPE?				
RESTRICTED AREA SIGN BOARDS AND WARNING SIGNS WRITTEN IN ARABIC AND ENGLISH (CLEARLY VISIBLE FROM A DISTANCE) PLACED AT EACH LOCATION?				
TEMPORARY CAMPS/CATTLE HERDS SPOTTED NEAR THE LOCATION?				
TEMPORARY CAMPS/CATTLE HERDS IF AVAILABLE, ARE THEY LOCATED AT A SAFE DISTANCE AS PER PROCEDURE?				
IF TEMPORARY CAMPS/CATTLE HERDS ARE PRESENT NEAR WELL LOCATION AND NOT MEETING SAFE DISTANCE CRITERIA, WAS THE XYZ LOCAL RELATIONS TEAM INFORMED FOR FURTHER ACTIONS?				
FLARE PIT/BURN OFF PIT PREPARED WITH TEMPORARY BARRICADE AND SAFETY WARNING SIGNS?				
XYZ WORK PERMIT CLOSED				

HANDING OVER – SIGNATURE PRODUCTION OP./GAS OP./WATER HANDLING TEAM NAME DESIGNATION XYZ ID -	TAKING OVER – SIGNATURE DRILLING OP./TRANSP. OP. SUPPORT TEAM NAME DESIGNATION XYZ ID -
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ANNEXURE 3 – PERMANENT SIGN BOARDS FOR LOCATIONS INSIDE/OUTSIDE XYZ FENCED AREA

Size = 1.0 x 2.0 m



Size = 0.90 x 0.90 m



ANNEXURE 4 – WELL LOCATION CERTIFICATION FOR SITE PREPARATION COMPLETION

WELL LOCATION CERTIFICATION FOR SITE PREPARATION COMPLETION			
DATE		WELL Nº	
RIG Nº		XYZ WORK PERMIT Nº. (LAST ISSUED)	
SUB-CONTRACTOR		CONTRACTOR	
XYZ CONTROLLING TEAM – DRILLING OPERATIONS			
SUPPORTING/DRILLING OPERATIONS/ TRANSPORT OPERATIONS			

ITEM DESCRIPTION	YES	NO	N/A	REMARKS
REMOVABLE FENCE AROUND WATER PIT, WATER-BASED MUD PIT AND OIL-BASED MUD PIT INSTALLED?				
WELLHEAD/CELLAR BARRICADED UPON COMPLETION WITH PORTABLE CONCRETE BLOCKS (STANDARD JERSEY BARRIERS)?				
4X SIGN BOARDS MENTIONING “DANGER RESTRICTED OIL FILED AREA (...)” ON ARABIC AND ENGLISH PROVIDED IN ALL 4 SIDES OF THE LOCATION?				LOCATIONS OUTSIDE XYZ FENCED AREA
2X SIGN BOARDS MENTIONING “DANGER RESTRICTED OIL FILED AREA (...)” ON ARABIC AND ENGLISH PROVIDED IN THE LOCATION?				LOCATIONS INSIDE XYZ FENCED AREA
FLARE PIT PREPARED BY XYZ TRANSPORT OPERATIONS AT SAFE DISTANCE IN THE WELL SITE AS PER SAFE DISTANCES PROCEDURE?				
SITE AREA IS CLEARED OF OIL SPILLS/SCRAP AND WASTE MATERIAL?				
ANY CAMP OR UNAUTHORISED PERSONNEL VISIBLE AROUND THE SITE. IF SO, DRILLING OPERATIONAL SUPPORT TEAM TO INFORM 115				
ALL OVERHEAD POWERLINES OUTSIDE THE SAFE DISTANCE FROM WELL SITE?				
UTILITY AND HYDROCARBON FLOW LINES UNDERGROUND OR ABOVE GROUND, OUTSIDE THE SAFE DISTANCES FROM WELL SITE AND WITH LAND MARKS? IF NO, PREVENTIVE MEASURES TO BE TAKEN AND ATTACHED TO THIS CHECKLIST.				
SITE AREA IS FREE FROM HAZARDS FOR RIG MOVE AND RIG OPERATIONS? IS THE SITE ACCESSIBLE TO EMERGENCY SERVICES?				
SITE PREPARATIONS CARRIED OUT AS PER CONTRACTOR, XYZ HSE AND OPERATIONS REQUIREMENTS?				
XYZ ASSETS/EQUIPMENT INSIDE WELL SITE WERE DAMAGED DURING THE ACTIVITIES? DAMAGED REPAIRED? IF YES, DETAILS TO BE SUBMITTED.				

COMPLETION OF WORK – SIGNATURE

RIG/TO CONTRACTOR/SUB-CONTRACTOR CIVIL REPRESENTATIVE

NAME & DATE

DESIGNATION

RIG/COMPANY & ID

ENDORSEMENT – SIGNATURE

DRILLING OP./TO REP./RIG STP

NAME & DATE

DESIGNATION

RIG/COMPANY & ID

ANNEXURE 5 - REQUIREMENTS FOR SECURING PITS AND WELLHEADS AT DRILLING WELL LOCATIONS

In order to secure pits and wellhead/cellar before spud, during operations and after rig release/rig-move, following requirements to be ensured by contractors in respect of all Drilling Well Locations.

1. For New Drilling Well Locations

1.1. During construction/site preparation of New Drilling Well Locations

Following works to be done by the contractor assigned to construct the New Drilling Well Location:

- 2m high removable fences to be provided covering all the Water Pits and Water Based Mud Pit;
- 2m high removable fences to be provided around Oil Based Mud Pit;
- Wellhead/cellar to be barricaded with portable concrete blocks (Standard Jersey Barriers) and removable type fencing after installing conductor pipe;
- Restricted Area sign boards and warning sign boards, written in Arabic & English as per XYZ HSE procedure (clearly visible from a distance), to be placed at each location;
- Acceptance of the New Build Location shall be as per the Annexure – 4 of the HSE procedure and signed by Contractor's Representative and Company's Representative.

1.2. During Drilling operations

Following works to be done by the Contractor assigned to drill the Well:

- Barricade consists of Portable Concrete blocks to be removed from around the cellar;
- Fences to be removed from Mud Tank side of all the pits.

1.3. After rig-move/rig release upon completion of drilling operations/ Site restoration

Following works to be done by the Contractor who has drilled the Well during site restoration:

- Well number embossed prominently on a 10" x 10" metal plate to be hanged with a wire at the wellhead;
- Removal type Fences (8m L x 8m W x 2m H) to be provided around Wellhead/Cellar complete with a gate and lock. (In case if the location is drilled by other contractor, then fencing to be done by the Contractor who has built the location);
- Fence to be put back towards Mud Tank side of the pits;

- Open pits to be supervised and monitored by the Contractor personnel until fencing work is completed;
- Restricted Area sign boards and warning sign boards written in Arabic & English (clearly visible from a distance) to be ensured (if required provided) at each location;
- All the Water Pits and Water Based Mud Pit to be backfilled upon completion of wells in accordance with the contract requirement (in case if the location is drilled by other contractor, then pits shall be back filled by the Contractor who has built the location);
- All necessary requirements as per checklist under Annexure-5 to be completed;
- Contractor shall handover the drilled well location as per XYZ procedure checklists, signed by Contractor's Rig-site Representative (Senior Toolpusher) and Company's Representative (Rig Supervisor/Company Man).

ANNEXURE 6 – WELL LOCATION CERTIFICATION OF COMPLETION OF SITE RESTAURATION & PITS BACK FILLING

WELL LOCATION CERTIFICATION OF COMPLETION OF SITE RESTAURATION & PITS BACK FILLING			
DATE OF COMPLETION		WELL Nº	
RIG Nº		XYZ WORK PERMIT Nº. (LAST ISSUED)	
SUB-CONTRACTOR		CONTRACTOR	
XYZ CONTROLLING TEAM – DRILLING OPERATIONS			
SUPPORTING/DRILLING OPERATIONS/ TRANSPORT OPERATIONS			

ITEM DESCRIPTION	YES	NO	N/A	REMARKS
PITS BACK FILLED AND SITE RESTORED (WATER, WATER-BASED AND OIL-BASED)? STATUS TO BE MENTIONED IN REMARKS.				
REMOVABLE FENCE AROUND THE PITS? STATUS TO BE MENTIONED IN REMARKS.				
4X SIGN BOARDS MENTIONING “DANGER RESTRICTED OIL FILED AREA (...)” ON ARABIC AND ENGLISH PROVIDED IN ALL 4 SIDES OF THE LOCATION?				LOCATIONS OUTSIDE XYZ FENCED AREA
2X SIGN BOARDS MENTIONING “DANGER RESTRICTED OIL FILED AREA (...)” ON ARABIC AND ENGLISH PROVIDED IN THE LOCATION?				LOCATIONS INSIDE XYZ FENCED AREA
SITE AREA IS CLEARED OF OIL SPILLS/SCRAP AND WASTE MATERIAL AND FREE OF HAZARDS?				
ANY CAMP OR UNAUTHORISED PERSONNEL VISIBLE AROUND THE SITE. IF SO, DRILLING OPERATIONAL SUPPORT TEAM TO INFORM 115				
SITE RESTORATION/PIT BACK FILLING CARRIED OUT AS PER CONTRACTOR, XYZ HSE AND OPERATIONS REQUIREMENTS?				
XYZ ASSETS/EQUIPMENT INSIDE WELL SITE WERE DAMAGED DURING THE ACTIVITIES? DAMAGED REPAIRED? IF YES, DETAILS TO BE SUBMITTED.				

COMPLETION OF WORK – SIGNATURE

RIG/TO CONTRACTOR/SUB-CONTRACTOR CIVIL REPRESENTATIVE

NAME & DATE

DESIGNATION

RIG/COMPANY & ID

ENDORSEMENT – SIGNATURE

DRILLING OP./TO REP./RIG STP

NAME & DATE

DESIGNATION

RIG/COMPANY & ID

ANNEXURE 7 – ROUTE SURVEY CHECKLIST

ROUTE SURVEY CHECKLIST				
RIG NAME		DATE		REMARKS
DRILLING GROUP		CONTROLLING TEAM		
CURRENT LOCATION		NEW LOCATION		
DISTANCE		EXPECTED DATE & TIME OF RIG RELEASE		

ITEM DESCRIPTION	REMARKS	ACTION TAKEN
RIG GRADED ROAD CONDITION/WIDTH ACCEPTABLE?		
ANY OVERHEAD POWERLINES CROSSINGS? ARE DISTANCES ACCEPTABLE?		
CONDITION OF ROAD SHOULDER		
ANY SHARP BENDS ON THE ROAD?		
ANY ROAD WASHOUTS?		
ANY SAND ACCUMULATION/SLUSH CONDITION ON ROAD?		
ANT PRESENCE OF UNDERGROUND OIL AND GAS LINE/UTILITY LINE IDENTIFIED AND ASSOCIATED RISKS CONTROLLED?		
NUMBER OF ROUNDABOUTS		
ANY ACTIVE FLARE PITS NEARBY RIG ROAD? THEIR DISTANCES?		
ANY OTHER OVER GROUND XYZ/CONTRACTOR PROPERTY NEARBY RIG ROAD THAT CAN OBSTRUCT RIG LOAD OR CONVOY MOVEMENT?		
ANY XYZ FENCE CROSSING REQUIRED?		
ANY PUBLIC ROAD OR ASPHALT ROAD CROSSING? IF YES, IS THE CLEARANCE BETWEEN THE ROAD AND RIG CONVOY ADEQUATE?		
ANY RIG MOVE ON PUBLIC ROAD?		
ANY SECURITY GATE (INTERNAL) CROSSINGS?		
ANY DEBRIS ON THE RIG ROAD?		
ANY OTHER HAZARDS (RIG ROAD REPAIRS, ROAD CUTTINGS, OBSTRUCTIONS, ETC.)?		

COMPLETION OF SURVEY – SIGNATURE

RIG/TO CONTRACTOR/SUB-CONTRACTOR CIVIL REPRESENTATIVE

NAME & DATE

DESIGNATION

RIG/COMPANY & ID

ENDORSEMENT – SIGNATURE

DRILLING OP./TO REP./RIG STP

NAME & DATE

DESIGNATION

RIG/COMPANY & ID

ANNEXURE 8 – PRE-RIG MOVE PLAN CHECKLIST

PRE-RIG MOVE PLAN CHECKLIST				
RIG NAME		DATE		REMARKS
CURRENT LOCATION		OVERHEAD POWERLINES MINIMUM HEIGHT		
NEW LOCATION		TOTAL LOADS FOR RIG ROAD CONVOY		
DISTANCE TO MOVE		TOTAL LOADS FOR PUBLIC ROAD CONVOY		
MAXIMUM TRUCK PER CONVOY		TOTAL NUMBER OF RIG LOADS		
NEAREST MEDICAL FACILITY		PHONE NUMBER		
XYZ SECURITY CONTACT NUMBER				
CONTRACTOR RESPONSIBLE SUPERVISOR NAME & PHONE NUMBER				

HAVE THE FOLLOWING BEEN COMPLETED?	YES	NO	N/A	REMARKS
IS ROUTE SURVEY CHECKLIST SHEET (ANNEXURE 7) & ROUTE MAP PREPARED AND SUBMITTED TO XYZ SUPERVISOR?				
IS RIG MOVE PLAN PREPARED?				
HAVE ALL REQUIRED SUPERVISORS FOR ROUTE SURVEY & HAZARD CHECKS INSPECTED RIG MOVE ROUTE?				
ARE THERE ANY RIG REPAIRS/RIG EQUIPMENT INSPECTION OR JOBS IDENTIFIED THAT NEED TO BE DONE BEFORE MOVE?				
ARE THERE ANY LIFTS REQUIRING A CRITICAL LIFTING PLAN?				
IS CRITICAL LIFTING PLAN BEEN PREPARED WITH PTW, JSA?				
ARE OVERHEAD POWERLINES IN THE RIG MOVE ROUTE LOCATED AND MARKED IN ROUTE MAP?				
WILL AN OVERHEAD POWERLINE NEED TO BE DE-ENERGIZED/TOP SECTION OF DRILLING RIG MAST NEED TO BE TILTED DUE TO OVERHEAD POWERLINE?				
HAVE ALL THE HAZARDS BEEN IDENTIFIED ALONG THE ROUTE & DOCUMENTED WITH CONTROL MEASURES?				
ARE THE CONCERNED XYZ SECURITY/CONTRACTOR SUPERVISORS INFORMED FOR ROAD CROSSINGS?				
ARE THE REQUIRED TYPE OF CERTIFIED CRANES BEEN SUPPLIED FOR THE MOVE?				
ARE ALL XYZ & CONTRACTOR SUPERVISORS AND XYZ ERC (115) BEEN INFORMED ABOUT RIG MOVE START TIME?				
ARE ALL SUPERVISORS AWARE OF XYZ EMERGENCY CONTACT NUMBER 115?				
ARE ACCOMMODATION ARRANGEMENTS AVAILABLE FOR THE CREW IF RIG MOVE ACTIVITIES TAKE MORE THAN 12 HRS?				
HAS TRANSPORTATION/ACCOMMODATION FOR DRIVERS REQUIRING SHIFT CHANGE BEEN ARRANGED?				
HAVE ALL ROAD LEGAL LOADS IDENTIFIED FOR CONVOY?				
HAVE ALL SKID ROAD LOADS IDENTIFIED FOR CONVOY?				
ARE RIG DIRECTION SIGNS VISIBLE & PLACED?				
ARE FLAT BED TRAILERS REQUIRED? IF YES, INDICATE NUMBER				
ARE HEAVY LIVE ROLL TRAILERS REQUIRED? IF YES, INDICATE NUMBER				
ARE HIGHWAY TRUCKS REQUIRED? IF YES, INDICATE NUMBER				
ARE LOW BED TRAILERS REQUIRED? IF YES, INDICATE NUMBER				

HAVE THE FOLLOWING BEEN COMPLETED?	YES	NO	N/A	REMARKS
IS LOADING, UNLOADING & TRANSPORTATION SEQUENCE PREPARED?				
IS THE JOURNEY MANAGEMENT PLAN AVAILABLE?				
IS THE CRITICAL EQUIPMENT LIST & CRITICAL LIFT LIST WITH WEIGHTS PREPARED?				
ARE ALL LIFTING GEAR, LIFTING APPLIANCES & CRANES INVOLVED IN PRE-RIG MOVE & POST RIG MOVE ACTIVITIES HAVING VALID LOAD RATINGS FOR THE EQUIPMENT TO BE LIFTED, WITH INSPECTION & CERTIFICATIONS INCLUDING XYZ CLEARANCE CERTIFICATES FOR MOBILE EQUIPMENT?				
INSPECTIONS OF RIG EQUIPMENT FOR ANY DEFECTS PRIOR TO LOADING & UNLOADING was CARRIED OUT WITH CHECK LIST TO PREVENT FALL OF EQUIPMENT & OBJECTS?				
ARE THE CURRENT APPROVED PROCEDURES (SOP'S) FOR ACTIVITIES RELATED TO PRE-RIG MOVE, RIG MOVE & POST RIG MOVE SPECIFIC TO THE RIG AVAILABLE AND FOLLOWED				
JSA MENTIONS THE RIG SPECIFIC ACTIVITIES AS PER RIG MOVE PROCEDURES FOR PRE-RIG MOVE, RIG MOVE & POST RIG MOVE? MENTIONING THE HAZARDS & CONTROL MEASURES? JSA TO BE REVIEWED BY DISCUSSING IN SAFETY MEETING WITH THE CREW INCLUDING SUB-CONTRACTORS?				
CONTROL MEASURES FOR ALL RIG MOVE ACTIVITIES AS PER XYZ & CONTRACTOR RISK REGISTERS IMPLEMENTED?				

COMPLETION OF SURVEY – SIGNATURE

RIG SUPERINTENDENT/TOOLPUSHER

NAME & DATE

DESIGNATION

RIG/COMPANY & ID

COMPLETION OF SURVEY – SIGNATURE

TRUCKPUSHER

NAME

DATE

RIG/COMPANY & ID

ANNEXURE 9 – PRE-RIG MOVE MEETING CHECKLIST

PRE-RIG MOVE MEETING CHECKLIST				
HAVE THE FOLLOWING BEEN COMPLETED?	YES	NO	N/A	REMARKS
IS THE ROUTE SURVEY CHECKLIST (ANNEXURE 7) FILLED, SIGNED AND AVAILABLE?				
IS THE PRE-RIG MOVE PLAN CHECKLIST (ANNEXURE 8) COMPLETE AND SIGNED?				
IS THE WELL-TO-WELL RIG MOVE PLAN PREPARED BY CONTRACTOR REVIEWED BY XYZ RIG SUPERVISOR?				
ARE THE RIG REPAIRS/INSPECTION JOBS, IF ANY IDENTIFIED, FOR PRE-RIG MOVE COMPLETED?				
ARE THE TRUCKING SUPERVISORS ONSITE?				
ARE THERE 2 ESCORT VEHICLES WITH THEIR DRIVERS ONSITE?				
IS THE CONTRACTOR SAFETY OFFICER AVAILABLE ONSITE?				
IS THE STP/NTP AVAILABLE ONSITE?				
IS THE RIG SUPERINTENDENT AVAILABLE ONSITE?				
HAVE CONVOY ROUTE HAZARDS AND OTHER HSE ISSUES IDENTIFIED AND DISCUSSED WITH THE CONCERNED?				
ARE THE JSA'S AVAILABLE FOR ALL THE RIG MOVE ACTIVITIES AND RESPONSIBILITIES ASSIGNED FOR REVIEW?				
ARE PRE-JOB SAFETY MEETINGS AND TOOL-BOX-TALKS PLANNED DURING RIG MOVE & WITH EVIDENCE?				
HAS A LOAD LIST BEEN PREPARED TO IDENTIFY LOAD OUT SEQUENCE?				
ARE THERE 2 PILOT TRUCKS WITH FLASHING LIGHTS FOR SKID ROAD CONVOY?				
ARE THERE 2 PILOT TRUCKS WITH FLASHING LIGHTS FOR HIGHWAY CONVOY?				
ARE ALL PILOT TRUCK DRIVERS SUPPLIED WITH HIGH VISIBILITY VEST?				
ARE THERE ADEQUATE NUMBER OF HEAVY TRUCKS AVAILABLE AS PER RIG MOVE PLAN?				
ARE THERE ADEQUATE NUMBER OF TRAILERS AVAILABLE AS PER RIG MOVE PLAN?				
DO ALL CRANES HAVE VALID INSPECTION & CERTIFICATION?				
ARE ALL RIGGERS TRAINED & AVAILABLE?				
DO ALL RIGGERS HAVE HIGH VISIBILITY VESTS?				
IS SUFFICIENT LIGHTING AVAILABLE DURING LOADING AND UNLOADING OPERATIONS?				
ARE ALL LOADS MARKED WITH LOAD HEIGHT, WIDTH, LENGTH & WEIGHT?				
ARE ALL WORKERS EQUIPPED WITH MANDATORY PPE?				
ARE ALL DRIVERS INSTRUCTED TO FOLLOW APPROVED RIG MOVE ROUTE AND CONVOY MOVEMENT ONLY?				
HAVE ALL TRUCKS/TRAILERS BEEN INSPECTED FOR DEFICIENCIES?				
HAS ALL LIFTING GEAR AND LIFTING APPLIANCES BEEN INSPECTED?				
ARE TAG LINES AVAILABLE & USED?				
IS THE FIRST AID BOX AVAILABLE & EQUIPPED & TRAINED PERSON AVAILABLE FOR TREATMENT DURING RIG MOVE?				
ARE ALL SECURED LOADS BEING INSPECTED BY THE TRUCKPUSHER BEFORE MOVING?				
DO ALL CONVOY SUPERVISORS BEEN PROVIDED WITH MOBILE PHONE/WALKIE TALKIE FOR COMMUNICATION BETWEEN THEM, AND CONTACT NUMBERS DISPLAYED IN VEHICLES?				
ARE ALL TRUCKS FULLY FUELLED?				
DO ALL TRUCKS HAVE WOOD BLOCKING MATERIAL AVAILABLE?				

PRE-RIG MOVE MEETING CHECKLIST				
HAVE THE FOLLOWING BEEN COMPLETED?	Yes	No	N/A	REMARKS
HAVE XYZ SECURITY BEEN NOTIFIED & UTILIZED FOR UPCOMING CROSSINGS?				
ARE ALL CRITICAL OPERATIONS SUPERVISED BY SENIOR PERSONNEL?				
HAVE ROLES & RESPONSIBILITIES DURING RIG MOVE DISCUSSED?				
SHIFT SCHEDULE OF CREW AVAILABLE, IF RIG MOVE INCLUDING LOADING & UNLOADING EXCEEDS MORE THAN 1 SHIFT (12 HRS)?				
ADEQUATE FLASH LIGHTS, WARNING LIGHTS, ETC., AVAILABLE IN EACH CONVOY FOR VISIBILITY DURING SAND STORM/FOG/DARKNESS?				
SPEED LIMITS FOR LIGHT & HEAVY VEHICLES & RIG MOVE CONVOY KNOWN BY DRIVERS?				
COMMUNICATION SYSTEMS AVAILABLE WITH ALL KEY PERSONNEL & DRIVERS, WITH LISTED CONTACT NUMBERS?				
XYZ SMART ALERT SYSTEM HANDED OVER TO CONTRACTOR, FIXED IN CONTRACTOR VEHICLE, CHECKED FOR FUNCTIONAL & AWARENESS FOR USAGE, RIG ROADS TRACING IN THE SMART ALERT SYSTEM?				
DRIVERS INVOLVED IN RIG MOVE UNDERGONE DEFENSIVE DRIVING TRAINING?				
ARE THE RIG MOVE CREW PROVIDED WITH REST PERIOD BETWEEN THEIR DAILY WORKING HOURS?				
RIG MOVE TO NEXT WELL, INFORMED BY XYZ RIG SUPERVISOR TO ERC (115) MENTIONING THE NEXT WELL COORDINATES, RIG ROUTE & ROAD CROSSING?				
LESSONS LEARNT, IF ANY, FROM PREVIOUS RIG MOVES IMPLEMENTED?				
NECESSARY PERMIT TO WORK FOR RIG MOVE TO NEW LOCATION ISSUED? NUMBER?				
DATE AND TIME OF RIG RELEASE?				

	NAME	SIGNATURE
XYZ RIG SUPERVISOR	_____	_____
XYZ HSE SUPERVISOR	_____	_____
RIG SUPERINTENDENT	_____	_____
TOOLPUSHER	_____	_____
RIG SAFETY OFFICER	_____	_____
TRUCKPUSHER	_____	_____

ANNEXURE 10 – CRITICAL LOAD DATA SHEET

CRITICAL LOAD DATA SHEET			
RIG NAME		HP: 550/750/1100/1500/3000	
LOAD NUMBER		TYPE OF CONVOY USED	
WHEELED OR NOT WHEELED LOAD		LIFTING EYES (Y/N)	
SLING SPECIFICATION & SLINGING METHODS		DIMENSION (L x W x H)	
TYPE OF LIFTING EQUIPMENT REQUIRED WITH SWL		WEIGHT OF LOAD (TONS)	
TYPE OF PRIME MOVER/TRAILER REQUIRED		LIFTING PLAN REQUIRED (Y/N)	
PHOTO OR DRAWING OF THE LOAD			

ANNEXURE 12 – PERMIT TO WORK FOR RIG MOVE AND NEW WELL SPUD

Permit No : Issue Date: Valid up to:					
<u>WELL SITE SPUD-IN / WORK-OVER PERMIT</u>					
Permit Applying for	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Drilling Operation</td> <td style="width: 50%; padding: 5px;"></td> </tr> <tr> <td style="padding: 5px;">Workover Operations</td> <td style="padding: 5px;"></td> </tr> </table>	Drilling Operation		Workover Operations	
Drilling Operation					
Workover Operations					
Asset details:					
Well No					
Location/Asset					
Asset Owning Team/Group					
Contractor / Rig details:					
Contractor					
Rig name & No.					
<u>Permit Authorization</u>					
This permit is being issued to move the Rig from location to well location for carrying out Drilling / Workover operations as per well plan.					
Name of Issuer (KOC Rig Supervisor): Controlling Team / Group: Signature & Date: Name of Receiver (Tool Pusher-Contractor): Contractor: Signature & Date:					
<u>Drilling & Workover Operations Completion & Permit Closeout</u>					
Drilling and work over operations has been completed in the well location Nowellsite and hereby closing this permit					
Name of Issuer (Tool Pusher / Contractor): Contractor: Signature & Date: Name of Receiver (KOC Rig Supervisor): Controlling Team/Group: Signature & Date:					
<u>Notes:</u>					
<ul style="list-style-type: none"> ❖ Permit to Spud the well will be issued by the KOC Rig supervisor to the Drilling Contractor Representative (Tool Pusher). ❖ All other remaining permits will be issued as per Drilling Contractor PTW System as following: <ul style="list-style-type: none"> × Tool Pusher will issue Permits for all Non-routine Operations (including for Service Companies operations). Non-routine critical operations related to the Well Integrity/ KOC Assets will be endorsed and countersigned by KOC Rig Supervisors. ❖ While issuing permits, the Drilling Contractor shall submit one copy to KOC Rig Supervisor 					

ANNEXURE 13 – PRE-SPUD CHECKLIST FOR DEEP DRILLING AND WORKOVER RIGS

PRE-SPUD CHECKLIST FOR DEEP DRILLING & WORKOVER RIGS			
DATE		WELL N. °	
RIG N. °		RIG CONTRACTOR	
INSPECTION TEAM			

LOCATION				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	ALL EQUIPMENT ARE SPOTTED PROPERLY AS PER THE RIG LAY OUT & XYZ SAFE DISTANCES?			
2.	LOCATION ENTRANCE & EXIT CLEARLY IDENTIFIED WITH SIGNS?			
3.	ALL HAZARD SIGNS ARE POSTED AT LOCATION?			
4.	PROPER TROUGH TO BE PROVIDED BEHIND BRINE/MUD TANKS FOR DRAINING WASTE TO WASTE PIT?			
5.	HAZARDOUS AND NON-HAZARDOUS WASTE BINS ARE PROVIDED?			
6.	ADEQUATE SIZE OF WASTE PITS WITH PROPER LINING HAS BEEN PROVIDED?			
7.	ENSURE CONFINED SPACE PERMIT IS COMPLETED AND IMPLEMENTED PRIOR TO ALL CELLAR ENTRIES. CELLAR AREA SHOULD BE MONITORED FOR EXPLOSIVE GASES/LEL, H ₂ S & O ₂ LEVELS WITH PORTABLE MULTI-GAS DETECTOR AND INDIVIDUAL H ₂ S DETECTOR.			
8.	CLEAN CELLAR, WELDED 4" DUMP VALVES ON 42" CONDUCTOR & CHECK IF CELLAR JET PUMP IS WORKING.			
9.	ENSURE THAT PREVIOUS LOCATION IS CLEANED & LEVELLED AS PER SITE RESTORATION REQUIREMENT.			

AIR WINCHES				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CHECK CONDITION AND FUNCTIONING TEST WHERE RELEVANT:			
	MOUNTINGS			
	MARKING PLATES INDICATING UP & DOWN			
	MARKING PLATES INDICATING THE SWL			
	WIRE LINE DRUM GUARDS			
	WINCH OPERATING CONTROLS			
	WINCH SAFETY CONTROLS			
2.	ENSURE MAN-RIDDING TUGGERS ARE CLEARLY DESIGNATED			
3.	CHECK WHEN MOUNTING BOLTS LAST INSPECTED OR REPLACED			
4.	CHECK AIR SILENCERS			

BOP HANDLING				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CHECK ALL FUNCTIONS ARE CLEARLY LABELLED			
2.	CHECK WHEN THE OVERHEAD BOP CRANES WERE LAST INSPECTED AND THAT THEY ARE CURRENTLY CERTIFIED			
3.	ENSURE THAT CRANES ARE FREE FROM OBSTRUCTIONS OVER THEIR FULL RANGE OF MOVEMENT IN THE CELLAR PIT AREA			

BOP HANDLING				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
4.	CHECK OPERATION OF ALL VISUAL AND AUDIO WARNING DEVICES FITTED TO BOP CRANES			
5.	ALL BOP EQUIPMENT RELEVANT SECTIONS ARE AVAILABLE			

BULK MUD & CEMENT SYSTEM				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	MAKE SURE ALL THE LINES ARE CORRECTLY LABELLED			
2.	MAKE SURE ALL SILOS ARE CLEAN AND DRY			
3.	PRESSURE TEST ALL VALVES AND LINES UP TO THE RATED WORKING PRESSURE			
4.	CHECK CERTIFICATION OF PRESSURE RELIEF VALVES. ENSURE THAT VALVES VENT INTO AREAS CLEAR OF PERSONNEL			
5.	FUNCTION TEST THE VENT LINES, PURGE LINES, SUPPLY AND DISCHARGE LINES			
6.	CHECK OPERATION OF BULK AIR COMPRESSORS AND DRIERS			
7.	CHECK CONDITION OF AND FUNCTION BULK MUD HOPPERS AND MIXERS			

CRANES & FORKLIFT				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK ALL CRANE FUNCTIONS ARE CLEARLY LABELLED			
2.	CHECK PM RECORDS TO ENSURE THAT THERE ARE NO OUTSTANDING MAINTENANCE ITEMS AND CRANE AND ASSOCIATED EQUIPMENT ARE FULLY CERTIFIED			
3.	OPERATE CRANE AND CHECK THAT ALL FUNCTIONS AND SAFETY DEVICES ARE OPERATIONAL			
4.	CHECK OPERATION OF ALL VISUAL AND AUDIO WARNING DEVICES FITTED TO CRANE AND FORKLIFT			
5.	CHECK GENERAL CONDITION OF CRANE CABINS, WALKWAYS AND ACCESS LADDERS AND STAIRS			
6.	CHECK CRANES AND FORKLIFT REFUELLING SYSTEMS FOR LEAKS			

DERRICK MAST				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK THAT THE LADDERS AND RESTING PLATFORMS ARE PROPERLY FASTENED AND IN ACCORDANCE WITH THE REGULATIONS			
2.	CHECK OPERATION AND CONDITION OF CLIMBING AIDS AND DERRICKMAN'S ESCAPE SYSTEM			
3.	CHECK THAT ALL TOOLS AND EQUIPMENT ARE SAFELY STORED OR TIED OFF			
4.	ROTARY TABLE CENTRING WITH RESPECT TO MAST + TOP DRIVE & ROTARY CENTRE & CELLAR CENTRE & CELLAR CONDUCTOR PIPE			
5.	CHECK EQUIPMENT INSTALLED IN THE MAST E.G. TAGGERS, COMMUNICATIONS. FUNCTION TEST AND SAFE INSTALLATION			
6.	ENSURE THAT ALL SHACKLES, BLOCKS, SLINGS, ETC., INSTALLED IN THE MAST ARE CORRECTLY COLOUR CODED AND INCLUDED IN THE LIFTING REGISTER. ALL SHACKLE PINS MUST BE "WIRED"			
7.	CHECK THAT DAILY AND WEEKLY DERRICK CHECKLISTS ARE IN PLACE AND COMPLETED AS REQUIRED			

DERRICK MAST				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
8.	CHECK THAT A "DERRICK MANAGEMENT" SYSTEM IS IN PLACE REGARDING DROPPED OBJECT AVOIDANCE			
9.	FALL PROTECTION (SELF RETRACTION) EQUIPMENT INSTALLED ON MONKEY BOARD			
10.	CHECK CONDITION OF FULL BODY HARNESS, FREE FALL DEVICE, ETC.			
11.	CASCADE SYSTEM WITH DISTRIBUTION STATIONS AT MONKEY BOARD IS AVAILABLE?			
12.	EMERGENCY ESCAPE CHUTE IS INSTALLED AND NO OBSTRUCTIONS ARE AT BASE AND THE SAND BANK IS MADE AT THE LANDING PLACE?			
13.	ELEVATOR IS PERIODICALLY INSPECTED/CERTIFIED AND SWL IS CLEARLY MARKED?			
14.	GUY LINES ARE PROPERLY INSTALLED?			
15.	PROPER WIRE ROPE GRIPS ARE USED?			
16.	ROPE TENSIONERS ARE AVAILABLE?			
17.	FOUR PARTS SHACKLES BEING USED FOR ALL PERMANENT FIXTURES?			
18.	DYNAMOMETERS ARE AVAILABLE?			
19.	GUY LINES ARE PROPERLY ANCHORED (AS PER OEM)?			
20.	CROWN WARNING (AIRCRAFT WARNING) LIGHTS ARE AVAILABLE AND WORKING?			
21.	DEADLINE ANCHOR PROPERLY SECURED?			
22.	DEADLINE STABILIZERS ARE AVAILABLE?			
23.	HOOK JAWS SWL MARKED?			
24.	SNATCH/PULLEY BLOCKS HAVE LOCKING DEVICE/SPRING CLIPS			

DOWNHOLE DRILLING EQUIPMENT				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	DRILL PIPE LAST INSPECTION DATA AVAILABLE?			
2.	VISUALLY EXAMINE ALL RIG DRILL PIPE, DRILL PIPE PUP-JOINTS AND HEAVYWEIGHT DRILL PIPE. CHECK GENERAL CONDITION, CORRECT GRADE AND WEIGHT AND DATE OF LAST INSPECTION. CHECK ALL PIPE SPECIFIED BY CONTRACT IS ONBOARD			
3.	VISUALLY EXAMINE ALL DRILL COLLARS AND PUP-COLLARS			
4.	CHECK TO ENSURE THAT ALL OTHER DOWNHOLE TOOLS (E.G. CROSSOVERS, BIT SUBS, ETC) LISTED ON THE RIG INVENTORY ARE ONBOARD AND HAVE BEEN INSPECTED AS PER CONTRACT			
5.	CHECK INVENTORY AND CONDITION OF DRILL PIPE FLOAT VALVES AND SPARES			
6.	BHA COMPLETELY PICKED UP & RACKED ON DERRICK BEFORE SPUD DATE			
7.	BHA & DRILL PIPES INSPECTED? SUBMIT COPY OF INSPECTION REPORT & BHA TALLY			

DRAWWORKS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	FUNCTION TEST ALL CONTROLS			
2.	RUN THE TRAVELLING BLOCK UP AND DOWN AND CHECK OPERATION OF:			
	A) EMERGENCY BACK-UP SYSTEM			

DRAWWORKS				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
	B) CROWN-O-MATIC/FLOOR-O-MATIC			
	C) CROWN BLOCK SAVER (PRIMARY BRAKING SYSTEM)			
	D) ELMAGCO BRAKING SYSTEM (BRAKE)			
3.	CHECK MAINTENANCE RECORDS WITH PARTICULAR REFERENCE TO BREAK BAND REPLACEMENT & NDT OF CRITICAL COMPONENTS			
4.	DRAW WORKS COOLING SYSTEM OK?			
5.	CHECK SYSTEM FOR LEAKS			
6.	CHECK CLUTCHES			

DRILLERS CONSOLE & DOGHOUSE				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK PRESSURE GAUGES FOR CONDITION AND CORRELATION WITH OTHER GAUGES:			
	A) MUD PRESSURE			
	B) AIR PRESSURE			
	C) WATER COOLING			
	D) OIL PRESSURE (DRAWWORKS)			
2.	CHECK OPERATION OF ALL DRILLING INSTRUMENTATION AND WHENEVER POSSIBLE CORRELATE READINGS:			
	A) TOP DRIVE AND ROTARY RPMs			
	B) FLOW-SHOW			
	C) PIT VOLUME TOTALIZER			
	D) TONG TORQUE INDICATOR			
	E) TOP DRIVE & ROTARY TORQUE			
	F) TOTCO DRILLING RECORD			
	G) ELECTRO-FLOW SYSTEM			
	H) ELECTRICAL AND MECHANICAL TRIP TANK LEVEL			
	I) WEIGHT INDICATOR			
3.	CHECK THAT ALL CCTV SYSTEMS ARE WORKING			
4.	CHECK THAT ALL ALARMS ARE WORKING CORRECTLY			
5.	CHECK OPERATION OF COMMUNICATION SYSTEMS BETWEEN DRILLER, DERRICKMAN, STP, DRILLING SUPERVISOR (CoMan) & MUD TANK OPERATORS			
6.	ALL DRILLER INSTRUMENTATION, SDI- GEOLOGRAPH IN WORKING CONDITION & CALIBRATED, ALL SDI PANELS IN STP, CoMan & SNR-CoMan OFFICES ARE CONNECTED & WORKING?			
7.	CHECK THAT ALL SWITCHES, BUTTONS, ETC. ARE LABELLED AND IN GOOD CONDITION			
8.	CHECK THAT ALL ELECTRICAL SWITCHING CORRESPONDS TO THE PANEL DESCRIPTION (TEST RUN ALL MACHINERY UNDER EVERY POSSIBLE ASSIGNMENT)			
9.	CHECK THAT ALL ELECTRICAL EQUIPMENT (E.G. SWITCHES, MOTORS, JUNCTION BOXES, ETC) ARE EXPLOSION PROOF. IF NOT, REMOVE THEM			
10.	CHECK THAT THERE ARE NO OBSTRUCTIONS AND THAT WALKWAYS AND ESCAPE ROUTES ARE CLEAR			
11.	CHECK GENERAL CONDITION OF CONSOLE INCLUDING DOORS AND WINDOWS			

RIG FLOOR STAND PIPE MANIFOLD				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK THAT ALL LINES AND VALVES ARE CORRECTLY LABELLED AND ALL VALVES HAVE HAND WHEELS			
2.	FLUSH ALL LINES WITH WATER AND FILL UP MANIFOLD			
3.	PRESSURE TEST MANIFOLD TO RATED MANIFOLD WORKING PRESSURE			
4.	RIGGED UP THE EZY TORQUE, CATHEADS, IRON ROUGHNECK & TESTED?			
5.	RIG UP SURVEY WIRE LINE MATHEY UNIT & SHEAVES. CHECK GEOGRAPH IS WORKING			
6.	CHECK ALL WIRE ROPES, DRILL-LINE, WINCH LINES, TONG LINES & MAN-RIDING LINE			
7.	CHECK PRESSURE GAUGES AND RECORDERS, CALIBRATE OR REPLACE IF NECESSARY			
8.	NOTE DATE OF LAST PIPE THICKNESS CHECK			
9.	TONGS ARE COLOUR CODED FOR PINCH POINTS AND SOFT GRIPS?			

STABBING BOARD				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK FOR SAFE INSTALLATION OF THE CASING STABBING BOARD. CHECK THAT IT IS SECURELY MOUNTED IN DERRICK			
2.	CHECK AIR SUPPLY, STABBING BOARD CONTROLS, AND BACKUP SAFETY SYSTEMS			
3.	FUNCTION TEST ON STABBING BOARD FOR FULL MOVEMENT UP, DOWN, EXTEND AND RETRACT			
4.	CHECK STABBING BOARD IS NOT FOULED BY ANY OTHER ITEMS OF RIG EQUIPMENT, TUGGER LINES, ETC.			
5.	CHECK STABBING BOARD IS CORRECTLY CERTIFIED AS A LIFTING APPLIANCE			
6.	FALL PROTECTION (INERTIA REEL) EQUIPMENT INSTALLED?			

SWIVEL				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK FOR OIL LEAKAGE			
2.	CHECK WHEN NEW WASH PIPE WAS LAST INSTALLED			
3.	CHECK FOR ABNORMAL NOISE OR VIBRATION			
4.	THE ABOVE WILL BE TESTED TO RATED WORKING PRESSURE AT THE SAME TIME AS THE TOP DRIVE			

TOP DRIVE SYSTEM (TDS)				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	RUN THE TOP DRIVE UP AND DOWN AND CHECK:			
	A) GUIDE RAILS			
	B) FOULING OF CABLES AND HOSES WITH DERRICK AND FITTINGS			
2.	DURING TEST CHECK:			
	A) FUNCTIONS PROPERLY LABELLED ON CONTROL PANEL			
	B) ALL INDICATORS/GAUGES WORKING			
	C) ALL ELECTRIC DEVICES EXPLOSION PROOF			
	D) OIL LEAKAGES			
	E) AIR LEAKAGES			

TOP DRIVE SYSTEM (TDS)				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
	F) INDICATOR LIGHTS OPERATIONAL?			
3.	INSTALL THE IBOP AND SAVER SUB USING THE PIPE HANDLER			
4.	FUNCTION TEST THE REMOTE OPERATED IBOP (KELLY COCK)			
5.	PRESSURE TEST THE IBOP AND TOP DRIVE MUD CIRCULATION COMPONENTS TO RATED WORKING PRESSURE			
6.	USING ROTARY TONG WITH TONG PULL LINE CHECK CALIBRATION OF THE TORQUE INDICATOR FOR MAKE UP AND BREAK OUT TORQUE			

ROTARY TABLE & TRANSMISSION				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	FUNCTION TEST THE ROTARY TABLE			
2.	CHECK RPM COUNTER			
3.	CHECK FOR ABNORMAL NOISE OR VIBRATION IN ALL GEARS			
4.	MAKE SURE ALL RATIOS (LOW AND HIGH SPEEDS) CAN BE EASILY ENGAGED			
5.	CHECK FOR OIL LEAKAGE			
6.	CHECK CONDITION OF ROTARY BUSHINGS AND ENSURE THAT DIMENSIONAL CHECKS HAVE BEEN CARRIED OUT UNDER THE PM SYSTEM			

FISHING TOOLS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	PHYSICALLY CHECK INVENTORY OF ALL FISHING TOOLS AND CONFIRM THAT IT CONTAINS ALL TOOLS LISTED IN THE CONTRACT			
2.	ENSURE THAT TOOLS AND GRAPPLES ARE AVAILABLE TO CATCH ALL OF THE CONTRACTOR'S DRILL STRING AND CROSSOVERS SIZES			
3.	ENSURE THAT ALL FISHING TOOLS HAVE BEEN REDRESSED AND INSPECTED SINCE LAST USAGE			

HYDRAULIC POWER UNITS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
NOTE	THESE TESTS REFER TO THE UNIT(S) NEEDED TO POWER EQUIPMENT SUCH AS IRON ROUGHNECK, FACILITIES ON TOP DRIVE, CASING TONGS & OTHER HYDRAULIC EQUIPMENT AT RIG FLOOR			
1.	OPERATION OF HYDRAULIC POWER UNITS WILL BE CHECKED WHEN TESTING THE ABOVE EQUIPMENT			
2.	CHECK OPERATING AND EMERGENCY SHUTDOWN CONTROLS			
3.	CHECK FOR LEAKS, AND NOTE GENERAL CONDITION OF EQUIPMENT			
4.	CHECK THAT UNIT'S ZONE RATING IS CORRECT FOR AREA THAT UNIT IS LOCATED IN			

LOW PRESSURE PIPING & VALVES				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CHECK ALL LINES ARE CLEARLY LABELLED TO INDICATE CONTENTS			

LOW PRESSURE PIPING & VALVES				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
2.	CIRCULATE THROUGH ALL LINES (E.G. TRANSFER, TREATMENT AND MIXING) WITH WATER AND CHECK FOR LEAKAGE OR PLUGGING			

MUD AGITATORS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	START ALL AGITATORS BEFORE FILLING UP THE TANKS			
2.	ALL MUD AGITATORS IN WORKING CONDITION IN ALL TANKS?			
3.	CHECK FOR NOISE AND VIBRATION			
4.	CHECK GENERAL CONDITION AND SECURITY OF AGITATORS, MOUNTINGS AND PADDLES			
5.	CHECK SYSTEM IN PLACE FOR LOCKING OUT MOTORS			

MUD DEGASSER, DESANDER & DESILTER				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CHECK PMS ON MOTORS, DRIVE BELTS, ETC. ABNORMALITIES TO BE FILLED IN ON REMARKS			
2.	VISUALLY CHECK EQUIPMENT, AND NOTE GENERAL CONDITION			
3.	FUNCTION TEST TO EQUIPMENT			

MUD GAS SEPARATOR				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CHECK GENERAL CONDITION OF SEPARATOR AND ASSOCIATED LINES AND VALVES			
2.	CHECK AND NOTE DATE OF LAST PIPE THICKNESS INSPECTION			
3.	FLUSH THROUGH SYSTEM WITH WATER AND CHECK FOR ANY LEAKS OR PLUGGING			
4.	CHECK CONDITION OF ALL INSTRUMENTATION LOCATED ON THE SEPARATOR & REMOTE LOCATION (DRILLER CONSOLE OR STP OFFICE)			

MUD MIXING, TRANSFER & CHARGING PUMPS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	RUN EACH PUMP SEPARATELY FOR FIFTEEN MINUTES WITH WATER AND CHECK FOR LEAKS AND OPERATING PRESSURE			
2.	RUN PUMPS AGAINST CLOSED VALVES AND CHECK OPERATING PRESSURE			
3.	CHECK INVENTORY OF PUMP SPARES			
4.	EMERGENCY SHOWER/EYE WASH STATION INSTALLED AND FUNCTIONING?			
5.	CHEMICAL HANDLING PPE AVAILABLE?			

MUD PITS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CHECK GENERAL CONDITION OF:			
	A) PITS			
	B) GRATINGS & ACCESS LADDERS			
	C) ISOLATING, EQUALIZING AND DUMP VALVES			
2.	ENSURE PITS ARE CLEARLY LABELLED			

MUD PITS				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
3.	FILL EACH PIT WITH WATER AND CHECK FOR LEAKS BETWEEN ADJACENT PITS AND THROUGH ISOLATING, DUMP AND EQUALIZING VALVES			
4.	PUMP THROUGH AND CHECK OPERATION OF ALL MUD GUNS			
5.	FOAM SPRINKLERS TO BE CHECKED & TESTED (WATER ONLY FOR TEST)			

TRIP TANK & FILL UP PUMP				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	FLUSH SYSTEM WITH WATER			
2.	RIG UP HOLE FILL UP LINE & LINE TO TRIP TANK			
3.	CHECK MANUAL AND ELECTRONIC TRIP TANK LEVEL MEASURING SYSTEMS AND CHECK CORRELATION BETWEEN THE TWO SYSTEMS			
4.	ENSURE THAT THE MECHANICAL LEVEL MEASURING SYSTEM CAN BE CLEARLY SEEN FROM THE DRILLER'S CONSOLE			

MUD PUMPS MANIFOLD & HIGH PRESSURE PIPING				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK THAT ALL LINES AND VALVES ARE CORRECTLY LABELLED AND ALL VALVES HAVE OPERATING HANDLES			
2.	FLUSH ALL LINES WITH WATER AND FILL UP MANIFOLD			
3.	PRESSURE TEST PUMP MANIFOLD TO RATED MANIFOLD WORKING PRESSURE			
4.	CHECK PRESSURE GAUGES AND RECORDERS, CALIBRATE OR REPLACE IF NECESSARY			
5.	WHENEVER POSSIBLE CROSS REFERENCE ALL GAUGES READING THE SAME PRESSURE SOURCE			
6.	CIRCULATING SYSTEM TESTED WITH ALL MUD PUMPS			
7.	ENSURE THAT THERE ARE NO THREADED HIGH PRESSURE CONNECTIONS ON THE MANIFOLD			
8.	MUD PUMP RELIEF LINES FIXED? CHECK MUD PUMPS FLUID END & DRESSED WITH LINERS FOR SPUDDING			
9.	NOTE DATE OF LAST PIPE THICKNESS CHECK			
10.	CHECK OIL PUMP, LINER COOLING PUMPS, HEAT EXCHANGERS AND ANCHOR HIGH PRESSURE DISCHARGE LINES			

SHALE SHAKERS				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	CHECK THE GENERAL CONDITION OF EACH SHAKER			
2.	RUN EACH SHAKER AND CHECK FOR:			
	A) ABNORMAL NOISE & VIBRATION			
	B) OIL LEAKAGE			
3.	CHECK INVENTORY OF SPARE PARTS FOR SHAKERS AND SHAKERS MOTORS			
4.	SHAKER SCREENS ON ALL SHAKERS & ALL SCREENS IN WORKING CONDITION?			
5.	CHECK INVENTORY OF SHAKER SCREENS AND ENSURE THAT IT IS SUITABLE FOR THE PROPOSED DRILLING PROGRAMME			
6.	CHECK CONDITION OF VALVES ON THE HEADER SYSTEM AND THE DISCHARGE CHUTES			

POWER & SERVICES				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CHECK CONDITION OF AND FUNCTION TEST THE MAIN POWER GENERATION SYSTEMS			
2.	ARE ALL THE REQUIRED SAFETY DEVICES INSTALLED AND FULLY OPERATIONAL?			
3.	CHECK THAT ALL REQUIRED SAFETY DEVICES ARE INSTALLED, OPERATIONAL AND CERTIFIED			
4.	CHECK CONDITION OF AND FUNCTION TEST THE EMERGENCY GENERATOR			
5.	FUNCTION TEST ALL AIR COMPRESSORS INCLUDING THE COLD START COMPRESSOR			
6.	ENSURE THAT ALL AIR RECEIVERS AND SAFETY RELIEF VALVES ARE CERTIFIED			
7.	ENGINES COOLING SYSTEM WORKING PROPERLY?			
8.	FUEL SUPPLY SYSTEM SHOULD BE LEAK PROOF. ALL ENGINES MUST BE IN RUNNING CONDITION			
9.	CHECK CONDITION OF AND FUNCTION TEST SEWAGE TREATMENT PLANT			
10.	CHECK POTABLE WATER SYSTEM AND PUMPS			

PLANNED MAINTENANCE (PM) SYSTEM				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	ENSURE THAT THE PM SYSTEM COMPLIES WITH THE RIG VERIFICATION SCHEME FOR SAFETY CRITICAL COMPONENTS			
2.	CARRY OUT RANDOM CHECKS ON THE PM SYSTEM TO ENSURE THAT THE WORK LISTED ON THE PM TASK FORMS HAS ACTUALLY BEEN COMPLETED			
3.	ENSURE THAT NO CRITICAL SAFETY OR OPERATIONAL MAINTENANCE TASKS ARE STILL OUTSTANDING ON THE PM SYSTEM			

HEALTH, SAFETY & ENVIRONMENT				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	FUNCTION TEST TO ALL DETECTION AND ALARM SYSTEMS INCLUDING: FIRE/H ₂ S/GAS/SMOKE DETECTORS/FIRE ALARMS AND EMERGENCY ALARMS/FOAM SYSTEMS & CALIBRATION OF SENSORS			
2.	CHECK CONDITION OF FIREFIGHTING EQUIPMENT AND CHECK PM SYSTEM TO ENSURE THAT ALL EQUIPMENT IS FULLY CERTIFIED AND MAINTAINED. FUNCTION TEST TO FIRE WATER PUMP AND FOAM UNIT TO BE CARRIED			
3.	WINDSOCKS CONDITION TO BE CHECKED, IF WORN OUT TO BE REPLACED			
4.	GROUP HSE DEPARTMENT & FIRE STATION (XYZ OR LOCAL) INFORMED OF NEW LOCATION? LOCATION MAP PROVIDED?			
5.	OIL & FUEL SPILL KIT IS IN PLACE?			
6.	FIRE EXTINGUISHERS PLACED AT DESIGNATED PLACES WITH INSPECTION DATE LABELLED ON EXTINGUISHERS AND WITH XYZ FIRE DEPT. APPROVAL?			
7.	MSDS (ENGLISH & ARABIC WRITTEN) FOR ALL CHEMICALS IN PLACE & PERSONNEL AWARE OF THE HAZARDS?			
8.	CHEMICAL STORAGE ORGANIZED & HAZARD SIGNAGES PLACED?			

HEALTH, SAFETY & ENVIRONMENT				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
9.	DESIGNATED SMOKING AREA AVAILABLE & PROPERLY IDENTIFIED?			
10.	DESIGNATED VEHICLE PARKING AREA AVAILABLE & PROPERLY IDENTIFIED? PARKING ON REVERSE SIGNAGES POSTED?			
11.	SAFETY INDUCTION & H ₂ S TRAINING IS IN PLACE AND BEING CARRIED OUT?			
12.	CHECK BREATHING APPARATUS KEPT ON DERRICK FLOOR. SHOULD BE READY FOR USE. CHECK THE CASCADE SYSTEM MANIFOLD INLET & OUTLET PRESSURE			
13.	CLASSIFIED HAZARD ZONE SIGNAGES POSTED?			
14.	H ₂ S & OTHER HAZARDOUS SIGN BOARDS PLACED?			
15.	CHECK CONDITION OF SAFETY HARNESES, FREE FALL DEVICES, FALL ARRESTORS, ETC.			
16.	EYE WASH FACILITY ON RIG FLOOR & MUD TANKS HOOKED UP? FUNCTION TEST IT			
17.	HOLD H ₂ S & BOP DRILL TO SEE CREW READINESS			
18.	TWO MUSTERING POINTS CLEARLY MARKED ON THE LOCATION?			
19.	ALL HIGH PRESSURE LINES ANCHORED/SNUBBED?			
20.	ENSURE FIRST AID KIT & STRETCHER IS AVAILABLE (MUD TANKS AREA, DRILL FLOOR AREA, ENGINE CONTROL ROOM & RIG SITE CAMP)			
21.	COMMUNICATION SYSTEM OPERATIONAL (PA, PHONE LINES & INTERNET LINES)			
22.	VISITOR LOGBOOK AVAILABLE AND PROPERLY ENTERED?			
23.	PERSONNEL EQUIPPED WITH NECESSARY PPE ON RIG FLOOR?			
24.	ANTI-COLLISION AVIATION LIGHT AT TOP OF MAST AVAILABLE & OPERATIONAL?			
25.	ALL RIG SIGNS LEADING TO THE RIG FROM THE MAIN ROAD ARE POSTED? ARE THEY ENOUGH?			
26.	ENSURE DRIP PANS FOR FILLING/REFILLING OF FUELS			
27.	ALL HAND RAILS, STEPS & STAIR CASINGS IN RIGHT ORDER?			
28.	ANY SLIP/TRIP HAZARDS IDENTIFIED AND CORRECTIVE ACTIONS TAKEN?			
29.	ALL ROTATING EQUIPMENT GUARDED?			
30.	MOH APPROVED AMBULANCE WITH BASIC TRAUMA CARE FACILITIES READY WITH VALID XYZ PASS AND LICENSED DRIVER?			
31.	RIG IS EQUIPPED WITH CLINIC WITH REQUIRED FACILITIES & MANNED BY QUALIFIED DOCTOR/LICENSED MEDIC/LICENSED PARAMEDIC?			
32.	PRE-SPUD MEETING HELD?			
33.	SITE SPECIFIC EMERGENCY RESPONSE PLAN IS IN PLACE & AND DRILL CONDUCTED PRIOR TO SPUD?			
34.	BREATHING AIR QUALITY IS MONITORED ON REGULAR BASIS?			
35.	ENOUGH END STOPPERS ARE AVAILABLE ON CATWALK AND PIPE RACK?			
36.	FLARE LINES ARE ADEQUATELY ANCHORED?			
37.	ENOUGH FLARE GUY LINES ARE IN PLACE?			

ADDITIONAL CHECKS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	ALL LADDERS FIXED & HAND RAILS PROVIDED?			

ADDITIONAL CHECKS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
2.	ALL CREW AVAILABLE FOR ALL SHIFTS AS PER CONTRACT?			
3.	MUD PITS AND CHARTS CALIBRATION BY GEOLOG/DATALOG? KILL SHEET IS PREPARED?			
4.	MUD PREPARATION VOLUME AS REQUIRED BY MUD COMPANY (9.6 PPG)?			
5.	PREPARE HI-VIS MUD 90+ FOR SWEEPS			
6.	RIG UP RECYCLE PUMP FROM WASTE PIT TO MUD TANKS			
7.	CHECK FLOW-LINE/ALL LINES ARE CLEAR OF ALL CUTTING & MUD-CAKE			
8.	INSTALL WATER LINE TO WATER TANKS FROM AVAILABLE WATER WELLS & FILL ALL TANKS			
9.	RIG UP SUITABLE LIGHTING AROUND RIG, CATWALK & CEMENTING SILOS, MUD TANKS, DIESEL TANKS & MUD PUMPS			
10.	ALL CUTTING TROUGHS & OVERFLOW PIPES TO BE PUT FROM TANKS TO WASTE PITS. CHECK AUGER TO BE IN GOOD CONDITION			
11.	CHECK AVAILABILITY OF PROPER CROSS-OVER SAFETY VALVES ON RIG FLOOR			

	NAME	SIGNATURE
XYZ RIG SUPERVISOR	_____	_____
XYZ HSE SUPERVISOR	_____	_____
TOOLPUSHER	_____	_____
RIG SAFETY OFFICER	_____	_____

ANNEXURE 14 – EMERGENCY DRILL MATRIX

EMERGENCY DRILL MATRIX			
SN	TYPE OF DRILL	DESCRIPTION	FREQUENCY
1.	FIRE	PREPARE EMERGENCY SCENARIOS, PERSONNEL MUSTER, HEAD COUNT, EMERGENCY RESPONSE AS PER PLAN, TESTING FIREFIGHTING AND ALARM SYSTEM	WEEKLY
2.	H ₂ S DRILL	PREPARE EMERGENCY SCENARIOS, PERSONNEL MUSTER AND HEAD COUNT, EMERGENCY RESPONSE AS PER PLAN, TESTING CASCADE SYSTEM MANIFOLDS RANDOMLY, REVIEWING CREW PREPAREDNESS FOR WEARING SCBAs	WEEKLY (WHEN DRILLING IN KNOWN H ₂ S ZONES)
			BI-WEEKLY (WHEN DRILLING IN NON H ₂ S ZONES)
3.	BOP	PREPARE EMERGENCY SCENARIOS, REVIEW ON CREW RESPONSE FOR HANDLING OF SAFETY VALVE, REVIEW THE CREW READINESS	WEEKLY
4.	PIT AND TRIP	IT SHALL BE UNANNOUNCED TO REVIEW THE CREW READINESS	BI-WEEKLY
5.	FIRST-AID & CASUALTY HANDLING	PREPARE EMERGENCY SCENARIOS, PERSONNEL MUSTER AND HEAD COUNT, RESCUE TEAM PARTICIPATION AS DESCRIBED IN RIG EMERGENCY PLAN CHECKING EMERGENCY VEHICLE READINESS	MONTHLY
6.	RESCUE (HEIGHT & CONFINED SPACE)	PREPARE EMERGENCY SCENARIOS, RIG RESCUE TEAM PARTICIPATION, USE/TESTING RESCUE EQUIPMENT	EVERY THREE MONTHS
7.	OIL SPILL CLEAN-UP	PREPARE EMERGENCY SCENARIOS USING OIL SPILL CONTAINMENT RESPONSE MATERIAL	EVERY SIX MONTHS
8.	RADIO COMMUNICATION	TEST CALL TO BE DONE WITH THE XYZ RADIO OPERATOR BY XYZ DRILLING SUPERVISOR	MONTHLY

ANNEXURE 15 – NOTIFICATION ON FLARING

GENERAL INFORMATION				
WELL N. °		XYZ DRILLING SUPERVISOR		
LOCATION		XYZ FENCE	<input type="radio"/> INSIDE	<input type="radio"/> OUTSIDE
RIG N. °		TYPE OF WELL	<input type="radio"/> VERT.	<input type="radio"/> DEV. <input type="radio"/> DEV.HOR.
XYZ HSE SUPERVISOR		TEAM LEADER		

CONTACT DETAILS	
EMERGENCY RESPONSE CENTRE	115 (ALSO INFORM ERC PRIOR TO FLARING)
XYZ DRILLING SUPERVISOR	
XYZ HSE SUPERVISOR	
TEAM LEADER	
D&T HSE TEAM LEADER	

FLARING DETAILS			
FLARING STARTS ON (DATE)		FLARING ENDS ON (DATE)	
ESTIMATED H ₂ S (%) IN WELL FLUIDS		PIT FLARING OR GROUND FLARING?	
ESTIMATED FLARING VOLUME (BBL/CUBIC FEET)		PREDOMINANT WIND DIRECTION & SPEED FORECAST	
LIKELY H ₂ S (MAX) CONCENTRATION IN THE AREA AND DISTANCE		LIKELY SO ₂ (MAX) CONCENTRATION IN THE AREA AND DISTANCE	

PRECAUTIONARY CHECKS & ACTIONS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	IS ALL THE RIG EQUIPMENT FOR FLARING OPERATIONS TESTED, INSPECTED AND READY FOR THE OPERATION?			
2.	IS THE FLARE LINE SECURED ADEQUATELY?			
3.	IS JSA CONDUCTED & PERMIT TO WORK ISSUED?			
4.	IS EMERGENCY RESPONSE COORDINATION UNIT (ERCU) INFORMED OF THE FLARING FOR NOTIFYING THE SURROUNDING XYZ FACILITY & XYZ SECURITY ?			
5.	IS NEARBY RIGS/CONCERNED GC NOTIFIED REGARDING FLARING WHICH ARE LIKELY TO BE EFFECTED BY HIGH TOXIC CONCENTRATIONS PROVIDED?			
6.	IS AREA BARRICADED AND SIGNAGE DISPLAYED?			
7.	ARE ROADWAYS CLOSED BY XYZ SECURITY FOR UNAUTHORIZED ENTRY & REROUTED?			
8.	IS H ₂ S AND SO ₂ MONITORED WITHIN THE RIG LOCATION & PERIPHERY?			
9.	IS SITE WELL PREPARED ON SELF-CONTAINED BREATHING AIR SYSTEM?			
10.	IS THIRD PARTY COMPETENT AGENCY CALLED FOR ASSISTANCE/GUIDANCE ON H ₂ S/SO ₂ (IF NEEDED)?			

PRECAUTIONARY CHECKS & ACTIONS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
11.	IS GREEN BURNER USED FOR FLARING OPERATION?			
12.	ARE ALL PERSONNEL AT SITE ARE H ₂ S TRAINED?			
13.	IS THE SITE WELL PREPARED ON EMERGENCY RESPONSE?			

	NAME	SIGNATURE
XYZ RIG SUPERVISOR	_____	_____
XYZ HSE SUPERVISOR	_____	_____
TOOLPUSHER	_____	_____

ANNEXURE 16 – RIG HSE INSPECTION CHECKLIST

RIG HSE INSPECTION CHECKLIST			
DATE		WELL N. °	
RIG N. °		RIG CONTRACTOR	
INSPECTION TEAM			

GENERAL				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	SAFETY GEAR AVAILABLE AND WORN			
2.	APPROPRIATE WARNING & SAFETY SIGNS DISPLAYED			
3.	QUALIFIED DOCTOR/LICENSED PARAMEDIC ON EACH CREW			
4.	FIRST AID SUPPLIES (FREQUENCY OF CHECKS)			
5.	EMERGENCY EYEWASH			
6.	ELECTRICAL RECEPTACLES, PLUGS AND WIRING IN GOOD ORDER			
7.	LIGHTING ADEQUATE & PROPERLY PROTECTED			
8.	FIRE EXTINGUISHERS – ALL MUST BE CHARGED, IN BRACKETS, TAGGED AND SEALED			
9.	FIREFIGHTING EQUIPMENT AVAILABLE (FREQUENCY OF CHECKS)			
10.	FIRE PUMPS TESTED – OUTPUT PRESSURE			
11.	LOCAL/REMOTE START FUNCTIONAL			
12.	FIRE PREVENTION – IGNITION HAZARDS PROHIBITED			
13.	POLLUTION CONTROL – NO FUEL SPILLS, RESERVE PIT LEAKS, TRASH IN PITS, ETC. (STANDING INSTRUCTIONS / REGULATIONS KNOWN)			
14.	GENERAL HOUSEKEEPING			
15.	CONFINED SPACE PROCEDURES IN EFFECT			
16.	LOCKOUT/TAG-OUT PROCEDURES IN EFFECT			
17.	HIGH PRESSURE LINES SECURED			
18.	FLARE LINES SECURED (HAZARD SIGNS POSTED)			
19.	SYSTEM OF HAZARDOUS AREA CLASSIFICATION USED			
20.	SAFE DRILLING PROCEDURES & STANDARDS - COMPLETE/UPDATED/AUTHORIZED			
21.	INCIDENT REPORTING FORMS – COMPLETE/UPDATED/AUTHORIZED			
22.	PROCEDURE FOR REPORTING INCIDENTS – AVAILABILITY			
23.	CONTINGENCY PLAN (E.G. CRITICAL H ₂ S WELLS) PROCEDURES KNOWN & USED			
24.	APPROPRIATE REGULATORY PERMITS – RECORDS KEPT			
25.	WORK PERMITS FORMS – RECORDS KEPT			
26.	REGULAR SAFETY INSPECTION BY CONTRACTOR; CORRECTIONS MADE - RECORDS KEPT			
27.	ACCIDENT PREVENTION PROGRAM IN EFFECT – RECORDS KEPT			
28.	SAFETY MEETINGS - RECORDS KEPT (DEFICIENCIES CORRECTED)			
29.	PIT DRILLS / BOP DRILLS - RECORDS KEPT (FREQUENCY)			
30.	FIRE DRILLS - RECORDS KEPT			
31.	ACCIDENT, INJURY & ILLNESS FORMS FILLED OUT; RECORDS; FOLLOW –UP ON ACCIDENTS (ACTION TAKEN)			
32.	FIRST AID LOG FOR MINOR INJURIES UPDATED			

GENERAL				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
33.	TRAINING FOR PERSONNEL (FIRST AID; WELL CONTROL; H ₂ S & OTHERS) CERTIFICATION ON FILE – RESPONSIBILITY, HOW CONTROLLED & REVIEW PROCESS			
34.	ALL EMPLOYEES MADE AWARE OF SAFETY POLICIES, ORIENTATION GIVEN TO ALL NEW EMPLOYEES (METHOD USED – BOOKLET, VIDEO, POSTERS, ETC)			
35.	HAZARDOUS/TOXIC SUBSTANCES IDENTIFIED (STORAGE & HANDLING PRECAUTIONS TAKEN; SDS AVAILABLE)			
36.	EMERGENCY TELEPHONE NUMBERS POSTED (WHEN CHECKED & TESTED)			
37.	MAINTENANCE PROGRAM & RECORDS FOR CRITICAL EQUIPMENT IN PLACE AND AVAILABLE			

PERSONAL PROTECTIVE EQUIPMENT				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	FOLLOWING SHOULD BE AVAILABLE AND USED AS REQUIRED:			
	A) VISITORS HARDHATS			
	B) EYE PROTECTION			
	C) HAND PROTECTION			
	D) PROTECTIVE CLOTHING			
	E) HEARING PROTECTION			
	F) RESPIRATORY PROTECTION			
	G) FULL BODY HARNESES			
2.	HARDHATS, COVERALLS & SAFETY SHOES WORN BY ALL PERSONNEL AT SITE			
3.	ABOVE PPE'S AVAILABLE IN SUFFICIENT QUANTITY & EASILY ACCESSIBLE			
4.	PPE'S ARE MAINTAINED IN GOOD CONDITION (EXPIRED ONES REMOVED)			

LIVING QUARTERS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CLEAN & TIDY			
2.	PROPERLY GROUNDED (EARTHING LAST MEASURED)			
3.	ELECTRICAL WIRING & OUTLETS IN GOOD ORDER (SUPPLY VOLTAGE CHECKED, DATE OF LAST CHECK)			
4.	TWO MEANS OF EXIT PROVIDED (DATE OF LAST FUNCTION TEST)			
5.	SMOKE DETECTORS PROVIDED (DATE OF LAST FUNCTION TEST)			
6.	FIRE EXTINGUISHERS/HOSE CABINETS PROVIDED (FREQUENCY OF CHECKING)			
7.	ALARMS (HOW INITIATED; AUDIBLE IN ALL AREAS; DATE OF LAST TEST)			
8.	VENTILATION, HEATING/AIR CONDITIONING PROVIDED (SATISFACTORY WORKING CONDITION)			
9.	EMERGENCY LIGHTING (DATE OF LAST TEST)			
10.	STATION BILLS POSTED; FIRE/ABANDON ALARM STATION AT EACH EXIT (ALL PERSONNEL BRIEFED & KNOW THEIR STATIONS)			
11.	ADEQUATE SEPTIC TANKS			
12.	BEDROOMS NOT OVERCROWDED (ADEQUATE AREA PER PERSON)			

PIPE RACK AREA				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	PIPE RACKS LEVEL AND IN GOOD CONDITION			
2.	ENDS PINNED & LAYERS CHOCKED			
3.	V-DOOR, RAMP AND CATWALK (LEVEL & IN GOOD CONDITION)			
4.	PIPE STOPS PROVIDED			
5.	STACKED MATERIAL SECURED AGAINST FALLING			
6.	GENERAL HOUSEKEEPING (AREA FREE FROM OBSTRUCTION)			

RIG FLOOR - GENERAL				
SN	ITEM DESCRIPTION	Yes	No	REMARKS
1.	EMERGENCY POWER SHUTDOWN AT DRILLER'S CONSOLE (REGULARLY CHECKED AND TESTED)			
2.	BACK – UP TO ELMAGCO BRAKE PROVIDED			
3.	HANDRAILS & TOE BOARDS COMPLETELY AROUND RIG FLOOR			
4.	V-DOOR GUARDED (ROUTINELY USED)			
5.	STAIRS & STEPS NON-SKID; PROPERLY SECURED WITH ADEQUATE HANDRAILS			
6.	FLOOR/ROTARY FLOOR AND RACKING AREA IN GOOD CONDITION			
7.	NON- SKID MATERIAL USED ON FLOOR/AROUND ROTARY FLOOR			
8.	FLOORS FREE OF GREASE & TRIPPING HAZARDS			
9.	CONDITION OF FLOOR BOARDS			
10.	SMOKING OR OPEN FLAMES PROHIBITED			
11.	FIRE EXTINGUISHERS IN AREA			
12.	OPENINGS ON FLOOR COVERED/GUARDED			
13.	MOVING MACHINERY PROPERLY GUARDED (DRIVE BELTS, CHAINS, FANS, GEARS, SHAFTS)			
14.	LIGHTING ADEQUATE, GUARDED & EXPLOSION PROOF			
15.	WIRING & OUTLETS IN GOOD CONDITION			
16.	TOOLS IN GOOD CONDITION & PROPERLY STORED (HAND TOOLS, BITS, ETC)			
17.	SAFETY VALVE & WRENCH ACCESSIBLE (STAB- ON KELLY COCK READY FOR INSTALLATION)			
18.	MUD BOX IN GOOD CONDITION & PROPERLY RIGGED			
19.	HOSE LINES FOR CIRCULATION IN GOOD CONDITION & SNUBBED OFF			
20.	ROTARY HOSE & KELLY SPINNER HOSE IN SATISFACTORY CONDITION & SNUBBED OFF AT STAND PIPE & SWIVEL			
21.	BOP CONTROLS LABELLED & OPERATING PROPERLY (LAST FUNCTION TEST, FREQUENCY)			
22.	CHOKE PANEL, GAUGES, CONTROLS (LAST FUNCTION TEST, FREQUENCY)			
23.	GEOLOGRAPH, FLOW-SHOW, PVT EQUIPMENT, ETC. OPERATIONAL			
24.	TWO MEANS OF EXIT FROM DOGHOUSE & RIG FLOOR			
25.	DOGHOUSE HEATERS NOT AN IGNITION SOURCE (FLAME PROOF CERTIFICATION)			
26.	FIRST AID KIT, STRETCHER & EYEWASH IN DOGHOUSE (READILY ACCESSIBLE)			
27.	BULLETIN BOARDS, SAFETY SIGNS, REQUIRED NOTICES, BOP PROCEDURES, MAX. ALLOWABLE CASING PRESSURE, ETC. (CORRECT INFORMATION POSTED)			

RIG FLOOR - GENERAL				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
28.	COMMUNICATIONS APPROPRIATE FOR LOCATION (TELEPHONES, RADIOS, ETC.)			

RIG FLOOR – TONGS & SLIPS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
0.	CHECK IF FOLLOWING EQUIPMENT IS IN GOOD CONDITION & OPERATIVE:			
1.	POWER TONGS			
2.	TONGS BODY AND JAWS (BACK-UP, BREAK OUT)			
3.	STIFF ARM			
4.	SAFETY GATE			
5.	HOSED & FITTINGS, WIRE ROPES (NO WORN WIRE ROPE)			
6.	SNUB LINES & JERK LINES (PROPERLY SECURED – CLAMPS)			
7.	SLIPS			

RIG FLOOR – DRAWWORKS & HOISTING GEAR				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	CROWN-O-MATIC PROPERLY INSTALLED; SETTING MAINTAINED; CHECKED EACH SHIFT			
2.	DRILL LINE IN GOOD CONDITION; TON MILEAGE UP TO DATE; SLIP/CUT AS REQUIRED (DATE OF LAST VISUAL INSPECTION)			
3.	DEAD-LINE ANCHOR & RETAINER (DATE OF LAST VISUAL INSPECTION)			
4.	ALL BOLTS IN PLACE & TIGHTENED ON DEAD-LINE ANCHOR (DATE OF LAST VISUAL INSPECTION)			
5.	BRAKES IN GOOD CONDITION; ADJUSTED & WORKING PROPERLY (LAST INSPECTION & ADJUSTMENT RECORDED)			
6.	WEIGHT INDICATOR IN GOOD SHAPE & WORKING PROPERLY			
7.	TRAVELLING BLOCK & HOOK IN GOOD CONDITION (WHEN LAST NDT TESTED)			
8.	OVERALL MAINTENANCE & APPEARANCE OF DRAWWORKS			
9.	SPINNING CHAIN (CHECK FOR DEFECTS)			
10.	ELEVATORS, BAILS (DATE OF LAST NDT CRACK DETECTION TEST)			

RIG FLOOR – CATHEADS HOISTS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
0.	CHECK IF FOLLOWING EQUIPMENT IS IN GOOD CONDITION & WORKING PROPERLY:			
1.	CATHEADS (SMOOTH, UN-GROOVED, GUARDED; EMERGENCY STOP EFFECTIVE & USED)			
2.	ROPE DIVIDER			
3.	CATLINE (TIED BACK SAFELY; PROPERLY STORED)			
4.	AUTOMATIC CATHEAD			
5.	HEADACHE POST (PROPERLY SECURED)			
6.	AIR HOIST LINE (PROPERLY SPOOLED, GUARDED, ANCHORED)			
7.	AIR TUGGER MARKED WITH SAFE WORKING LOAD?			
8.	HOOKS			
9.	WIRE ROPE – LOOPS SECURED WITH 3 CLAMPS OR PRESSED FITTING (CLAMPS ON DEAD ENDS)			
10.	OVERALL CONDITION OF ALL ROPES, CHAINS, SLINGS, HOOKS (INSPECTION/TESTING RECORDS)			

RIG FLOOR – CATHEADS HOISTS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
11.	MAN-RIDDING WINCH (TEST RECORDS /FAIL SAFE BRAKE)			
12.	WELL CONTROL PROCEDURES DISPLAYED			

DERRICK				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	DERRICK PINS & KEEPERS (ALL IN PLACE & GOOD CONDITION)			
2.	ESCAPE LINE WITH GERONIMO (PROPERLY RIGGED)			
3.	CLIMBING ASSIST (INSTALLED, ADJUSTED, USED)			
4.	SAFETY BELT & LINES (IN GOOD CONDITION, USED)			
5.	DERRICK LADDER (NO RUNGS BENT OR MISSING)			
6.	PIPE FINGERS SNUBBED WITH SAFETY CHAIN			
7.	ADEQUATE DERRICK LIGHTING (EXPLOSION PROOF, SECURED)			
8.	SILLS / BUMPER BOARD TO PREVENT RUNNING INTO CROWN			
9.	CROWN BLOCK (REGULARLY MAINTAINED)			
10.	FLASHING RED LIGHT IN CROWN			
11.	ANY TOOLS USED IN DERRICK PROPERLY SECURED			
12.	STAND PIPE SECURED; MUD HOSE SNUBBED AT BOTH ENDS			
13.	ALL WIRE ROPE IN GOOD CONDITION; NO WIRE ROPE RUBBING AGAINST STRUCTURAL MEMBERS			
14.	HYDRAULIC SYSTEM & CYLINDERS (NO LEAKS VISIBLE)			
15.	MANUAL LATCH DOGS			
16.	CONDITION OF DERRICK (CRACKS / CORROSION)			
17.	GAS BURNER VENT LINE ROUTED TO SAFE LOCATION			

SHALE SHAKER AREA				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	MOVING MACHINERY PROPERLY GUARDED			
2.	STAIRS IN GOOD CONDITION; NON-SLIP; SECURED			
3.	HANDRAILS FITTED ON ALL PASSAGEWAYS & STAIRS (GOOD CONDITION, SECURED)			
4.	PASSAGEWAYS CLEAR, NO OBSTRUCTIONS (NO MISSING, LOOSE GRATINGS)			
5.	CONDITION OF GRATING AND FLOOR			
6.	ADEQUATE LIGHTING (EXPLOSION PROOF)			
7.	EYEWASH STATION NEARBY			

MUD TANKS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	MOVING MACHINERY PROPERLY GUARDED			
2.	PASSAGEWAYS CLEAR, NO OBSTRUCTIONS (NO MISSING, LOOSE GRATING)			
3.	STAIRS IN GOOD CONDITION; NON-SLIP; SECURED			
4.	HANDRAILS FITTED ON ALL PASSAGEWAYS & STAIRS (GOOD CONDITION, SECURED)			
5.	ADEQUATE LIGHTING (EXPLOSION PROOF)			
6.	ELECTRICAL EQUIPMENT / WIRING (IN ACCORDANCE WITH HAZARDOUS AREA CLASSIFICATION)			
7.	PVT EQUIPMENT SECURE & WORKING PROPERLY			
8.	PRESSURE RELIEF LINES PROPERLY SECURED (SLOPED AWAY FROM RELIEF VALVE)			
9.	EYEWASH/EMERGENCY SHOWER STATION NEARBY (WORKING PROPERLY)			

MUD TANKS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
10.	PERSONAL PROTECTIVE EQUIPMENT AVAILABLE AND USED			
11.	VALVES ACCESSIBLE & IN GOOD CONDITION			
12.	GENERAL HOUSEKEEPING			
13.	SMOKING PROHIBITED			

SACK STORAGE & BULK SILOS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	SACK MATERIAL PROPERLY STACKED ON PALLETS			
2.	TORN SACKS CLEANED UP & KEPT TO A MINIMUM			
3.	CAUSTIC SODA & OTHER HAZARDOUS CHEMICALS PROPERLY LABELLED, STORED & HANDLED (CHEMICAL WARNING SIGNS)			
4.	ADEQUATE VENTILATION			
5.	LIGHTS WORKING			
6.	EYEWASH & PERSONAL PROTECTIVE EQUIPMENT AVAILABLE & USED			
7.	FORKLIFT PROPERLY MAINTAINED & OPERATED SAFELY (DRIVER PROPERLY QUALIFIED)			
8.	BULK & CEMENT TANKS FITTED WITH RUPTURE DISCS AND / OR RELIEF VALVE			

MUD HOPPER & MIXING BARREL				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	MUD HOPPER – SAFE ACCESS AND EXIT			
2.	CHEMICAL BARREL SAFELY CONSTRUCTED (CHEMICAL WARNING SIGNS)			
3.	PERSONNEL INSTRUCTED IN SAFE HANDLING OF CHEMICALS (PROCEDURE IN PLACE & ENFORCED)			
4.	PERSONAL PROTECTIVE EQUIPMENT AVAILABLE & USED			
5.	EYEWASH/EMERGENCY SHOWER READILY AVAILABLE (IN GOOD WORKING CONDITION)			
6.	SAFETY DATA SHEETS READILY AVAILABLE			

MUD PUMPS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	RELIEF VALVES PINNED, SET & COVERED (LAST TEST & PRESSURE SETTING)			
2.	RELIEF LINE PROPERLY VENTED & SECURED			
3.	VIBRATOR HOSE SNUBBED AT BOTH ENDS			
4.	MOVING MACHINERY PROPERLY GUARDED			
5.	RELIEF VALVES PINNED, SET & COVERED (LAST TEST)			

PAINT STORAGE AREAS				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	PAINT AND PAINT THINNERS PROPERLY STORED/COVERED			
2.	SPILL PREVENTION EQUIPMENT PROVIDED			
3.	GENERAL HOUSEKEEPING			

FUEL TANKS & FUEL TRANSFER AREA				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
1.	FUEL TANKS SAFELY LOCATED			

FUEL TANKS & FUEL TRANSFER AREA				
SN	ITEM DESCRIPTION	YES	NO	REMARKS
2.	CONTENTS PROPERLY LABELLED & WARNING SIGNS (FIRE HAZARD, NO SMOKING)			
3.	TANKS VENTED (VENTS OPEN)			
4.	FIRE EXTINGUISHERS PROVIDED/ACCESSIBLE			
5.	FUEL TRANSFER EQUIPMENT IN GOOD CONDITION (EARTHING/GROUNDING DEVICE)			
6.	FUEL TRANSFER PROCEDURES POSTED/ENFORCED			
7.	GENERAL HOUSEKEEPING			
8.	SPILL PREVENTION EQUIPMENT PROVIDED			
9.	LADDERS SECURED & IN GOOD CONDITION			
10.	PRESSURIZED TANKS RATED FOR PRESSURE (CERTIFICATION EXPIRY DATE)			